ESD Resin

SECTION 1: Identification

Product identifier

Product name: ESD Resin
Product code: FLTO2001

Recommended use of the product and restriction on use

Relevant identified uses: For use in Formlabs SLA Printers
Uses advised against: Not determined or not applicable.
Reasons why uses advised against: Not determined or not applicable.

Manufacturer or supplier details

Manufacturer:	**Supplier:**
United States	**Australia**
Formlabs, Inc	Alloys
35 Medford St	40 Koornang Rd
Suite 201 Somerville, MA 02143	Scoresby, VIC 3179
+1 617 855 0762	(03) 9415 8888
sds@formlabs.com	https://www.alloys.com.au/

Emergency telephone number:

APAC
CHEMTREC (APAC)
+65 3163 8374 (24/7)
Medical emergency phone number: 13 11 26 (24/7)

SECTION 2: Hazard(s) identification

GHS classification:

Skin irritation, category 2
Eye irritation, category 2A
Skin sensitization, category 1
Specific target organ toxicity - single exposure, category 3, respiratory tract irritation

Label elements

Hazard pictograms:

Signal Word: Warning

Hazard statements:

H315 Causes skin irritation
H319 Causes serious eye irritation
H317 May cause an allergic skin reaction
H335 May cause respiratory irritation

Precautionary statements:

P264 Wash skin thoroughly after handling
P280 Wear protective gloves
P261 Avoid breathing dust/fume/gas/mist/vapours/spray

P272 Contaminated work clothing should not be allowed out of the workplace
P271 Use only outdoors or in a well-ventilated area
P302+P352 IF ON SKIN: Wash with plenty of soap and water
P332+P313 If skin irritation occurs: Get medical advice/attention
P362 Take off contaminated clothing and wash before reuse
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P337+P313 If eye irritation persists: Get medical advice/attention.
P333+P313 If skin irritation or rash occurs: Get medical advice/attention
P363 Wash contaminated clothing before reuse
P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
P312 Call a POISON CENTER or physician if you feel unwell.
P403+P233 Store in a well-ventilated place. Keep container tightly closed
P405 Store locked up
P501 Dispose of contents/container in accordance with local/regional/national regulations

Hazards not otherwise classified:

None

SECTION 3: Composition and information on ingredients

Identification	Name	Weight %
CAS number: 72869-86-4	Urethane Dimethacrylate	55-75
CAS number: 27813-02-1	Methacrylic acid, monoester with propane-1,2-diol	15-25
CAS number: 7534-94-3	Isobornyl methacrylate	10-15
CAS number: 162881-26-7	Phenyl bis(2,4,6-trimethylbenzoyl)-phosphine oxide	<1

Additional Information: None

SECTION 4: First aid measures

Description of first aid measures

General notes:

Show this Safety Data Sheet to the doctor in attendance.

After inhalation:

If inhaled, remove person to fresh air and place in a position comfortable for breathing. Keep person at rest. If breathing is difficult, administer oxygen. If breathing has stopped, provide artificial respiration. If experiencing respiratory symptoms, seek medical advice/attention.

After skin contact:

Remove contaminated clothing and shoes. Rinse skin with copious amounts of water [shower] for several minutes. Launder contaminated clothing before reuse. If symptoms develop or persist, seek medical advice/attention.

After eye contact:

Rinse eyes with plenty of water for several minutes. Remove contact lenses if present and easy to do so.

Protect unexposed eye. If symptoms develop or persist, seek medical advice/attention.

After swallowing:

If swallowed, DO NOT induce vomiting unless told to do so by a physician or poison control center. Rinse mouth with water. Never give anything by mouth to an unconscious person. If spontaneous vomiting occurs, place on the left side with head down to prevent aspiration of liquid into the lungs. If symptoms develop or persist, seek medical advice/attention.

Most important symptoms and effects, both acute and delayed

Acute symptoms and effects:

Skin contact may result in redness, pain, burning and inflammation.

Eye contact may result in irritation, redness, pain, inflammation, itching, burning and tearing.

Dermal exposure may cause an allergic skin reaction. Symptoms may include irritation, redness, pain, rash, inflammation, itching, burning and dermatitis.

Inhalation may have adverse effects on the respiratory tract. Symptoms may include cough, breathing difficulties, sore throat and inflammation of the mucous membrane lining the respiratory tract.

Delayed symptoms and effects:

Effects are dependent on exposure (dose, concentration, contact time).

Immediate medical attention and special treatment

Specific treatment:

If respiratory symptoms persist, seek medical attention.

Notes for the doctor:

Treat symptomatically.

SECTION 5: Fire fighting measures

Extinguishing media

Suitable extinguishing media:

Water mist/fog, carbon dioxide, dry chemical or alcohol resistant foam.

Unsuitable extinguishing media:

Do not use water jet.

Specific hazards during fire-fighting:

Thermal decomposition may produce irritating/toxic fumes/gases.

Special protective equipment for firefighters:

Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full-face piece operated in positive pressure mode.

Special precautions:

Avoid contact with skin, eyes, hair and clothing. Do not breathe fumes/gas/mists/aerosols/vapors/dusts. Move containers from fire area if safe to do so. Use water spray/fog for cooling fire exposed containers. Avoid unnecessary run-off of extinguishing media which may cause pollution.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures:

Evacuate unnecessary personnel. Ventilate area. Extinguish any sources of ignition. Wear recommended personal protective equipment (see Section 8). Avoid contact with skin, eyes and clothing. Avoid breathing mist, vapor, dust, fume and spray. Do not walk through spilled material. Wash thoroughly after handling.

Environmental precautions:

Prevent further leakage or spillage if safe to do so. Prevent from reaching drains, sewers and waterways. Discharge into the environment must be avoided.

Methods and material for containment and cleaning up:

Do not touch damaged containers or spilled material unless wearing appropriate personal protective clothing. Stop leak if you can do it without risk. Contain and collect spillage and place in suitable container for future disposal. Dispose of in accordance with all applicable regulations (see Section 13).

Reference to other sections:

For personal protective equipment see Section 8. For disposal see Section 13.

SECTION 7: Handling and storage precautions

Precautions for safe handling:

Use appropriate personal protective equipment (see Section 8). Use only with adequate ventilation. Avoid breathing mist/vapor/spray/dust. Do not eat, drink, smoke, or use personal products when handling chemical substances. Avoid contact with skin, eyes and clothing. Wash affected areas thoroughly after handling. Keep away from incompatible materials (See Section 10). Keep containers tightly closed when not in use.

Conditions for safe storage, including any incompatibilities:

Store in cool, dry, well-ventilated location out of direct sunlight. Keep away from food and beverages. Protect from freezing and physical damage. Store away from heat, open flames and other sources of ignition. Keep container tightly sealed. Store away from incompatible materials (See Section 10).

SECTION 8: Exposure controls and personal protection

Only those substances with limit values have been included below.

Occupational Exposure limit values:

No occupational exposure limits noted for the ingredient(s).

Biological limit values:

No biological exposure limits noted for the ingredient(s).

Information on monitoring procedures:

Not determined or not applicable.

Appropriate engineering controls:

Emergency eye wash stations and safety showers should be available in the immediate vicinity of use or handling. Provide adequate ventilation to maintain the airborne concentrations of vapor, mists, and/or dusts below the applicable workplace exposure limits, while observing recognized national standards (or equivalent).

Personal protection equipment

Eye and face protection:

Safety glasses or goggles. Use eye protection equipment that has been tested and approved by recognized national standards (or equivalent).

Skin and body protection:

Chemical resistant, impervious gloves approved by the appropriate standards. Gloves must be inspected prior to use. Avoid skin contact with used gloves. Appropriate techniques should be used to remove used gloves and contaminated clothing. Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Ensure that all personal protective equipment is approved by recognized national

standards (or equivalent).

Respiratory protection:

If engineering controls do not maintain airborne concentrations below the applicable workplace exposure limits, or to an acceptable level (if exposure limits have not been established), a respirator approved by recognized national standards (or equivalent) must be worn.

General hygienic measures:

When handling chemical products, do not eat, drink or smoke. Wash hands after handling, before breaks, and at the end of the workday. Avoid contact with skin, eyes and clothing. Wash contaminated clothing before reuse. Perform routine housekeeping.

SECTION 9: Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Grey Liqud
Odor	Characteristic acrylate
Odor threshold	Not determined or not available.
pH	Not determined or not available.
Melting point/freezing point	Not determined or not available.
Initial boiling point/range	Not determined or not available.
Flash point (closed cup)	> 100°C
Evaporation rate	> 93.5°C
Flammability (solid, gas)	Not Flammable
Upper flammability/explosive limit	Not determined or not available.
Lower flammability/explosive limit	Not determined or not available.
Vapor pressure	Not determined or not available.
Vapor density	Not determined or not available.
Density	1.11 g/cm3
Relative density	Not determined or not available.
Solubilities	Not determined or not available.
Partition coefficient (n-octanol/water)	Not determined or not available.
Auto/Self-ignition temperature	Not determined or not available.
Decomposition temperature	Not determined or not available.
Dynamic viscosity	1600 cps @ 25°C
Kinematic viscosity	Not determined or not available.
Explosive properties	Not determined or not available.
Oxidizing properties	Not determined or not available.

SECTION 10: Stability and reactivity

Reactivity:

Not reactive under recommended handling and storage conditions.

Chemical stability:

Stable under recommended handling and storage conditions.

Possibility of hazardous reactions:

Hazardous reactions are not anticipated under recommended conditions of handling and storage.

Conditions to avoid:

Extreme heat, open flames, hot surfaces, sparks, ignition sources and incompatible materials.
Avoid storage >38°C (100°F) and exposure to light/direct sunlight and heat.

Incompatible materials:

Polymerization initiators, including peroxides, strong oxidizing agents, alcohols, copper, copper alloys, carbon steel, iron, rust, and strong bases.

Hazardous decomposition products:

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Hazard information

Acute toxicity

Assessment: Based on available data, the classification criteria are not met.

Product data: No data available.

Substance data:

Name	Route	Result
Methacrylic acid, monoester with propane-1,2-diol	oral	LD50 Rat: >=2000 mg/kg
	dermal	LD50 Rabbit: >5000 mg/kg
Isobornyl methacrylate	oral	LD50 Rat: 3160 mg/kg
	dermal	LD50 Rabbit: >3000 mg/kg
Urethane Dimethacrylate	oral	LD50 Rat: >5000 mg/kg
	dermal	LD50 Rat: >2000 mg/kg
Phenyl bis(2,4,6-trimethylbenzoyl)-phosphine oxide	oral	LD50 Rat: >2000 mg/kg
	dermal	LD50 Rat: >2000 mg/kg

Skin corrosion/irritation

Assessment:

Causes skin irritation.

Product data:

No data available.

Substance data:

Name	Result
Isobornyl methacrylate	Causes skin irritation

Serious eye damage/irritation

Assessment:

Causes serious eye irritation.

Product data:

No data available.

Substance data:

Name	Result
Methacrylic acid, monoester with propane-1,2-diol	Causes serious eye irritation.
Isobornyl methacrylate	Causes serious eye irritation

Respiratory or skin sensitization

Assessment:

May cause an allergic skin reaction.

Product data:

No data available.

Substance data:

Name	Result
Urethane Dimethacrylate	May cause an allergic skin reaction.
Methacrylic acid, monoester with propane-1,2-diol	May cause an allergic skin reaction.
Phenyl bis(2,4,6-trimethylbenzoyl)-phosphine oxide	May cause an allergic skin reaction.

Carcinogenicity

Assessment: Based on available data, the classification criteria are not met.

Product data: No data available.

Substance data: No data available.

International Agency for Research on Cancer (IARC):

Name	Classification
Urethane Dimethacrylate	Not Applicable
Methacrylic acid, monoester with propane-1,2-diol	Not Applicable
Isobornyl methacrylate	Not Applicable
Phenyl bis(2,4,6-trimethylbenzoyl)-phosphine oxide	Not Applicable

National Toxicology Program (NTP): None of the ingredients are listed.

Germ cell mutagenicity

Assessment: Based on available data, the classification criteria are not met.

Product data:

No data available.

Substance data: No data available.

Reproductive toxicity

Assessment: Based on available data, the classification criteria are not met.

Product data:

No data available.

Substance data: No data available.

Specific target organ toxicity (single exposure)

Assessment:

May cause respiratory irritation.

Product data:

No data available.

Substance data:

Name	Result
Isobornyl methacrylate	May cause respiratory irritation

Specific target organ toxicity (repeated exposure)

Assessment: Based on available data, the classification criteria are not met.

Product data:
No data available.

Substance data: No data available.

Aspiration toxicity

Assessment: Based on available data, the classification criteria are not met.

Product data:
No data available.

Substance data: No data available.

Information on likely routes of exposure:
No data available.

Symptoms related to the physical, chemical and toxicological characteristics:
No data available.

Other information:
No data available.

SECTION 12: Ecological information

Acute (short-term) toxicity

Assessment: Based on available data, the classification criteria are not met.

Product data: No data available.

Substance data:

Name	Result
Isobornyl methacrylate	Fish LC50 Danio rerio: 1.79 mg/L (96 hr)
	Aquatic Invertebrates EC50 Daphnia magna: 2.57 mg/L (48 hr [mobility])
	Aquatic Plants EC50 Pseudokirchneriella subcapitata: 2.28 mg/L (72 hr [growth rate])
Urethane Dimethacrylate	Fish LC50 Danio rerio: 10.1 mg/L (96 hr)
	Aquatic Invertebrates EC50 Daphnia magna: > 1.2 mg/L (48 hr)
Methacrylic acid, monoester with propane-1,2-diol	Aquatic Plants EC50 Pseudokirchneriella subcapitata: >97.2 mg/L (72 hr [growth rate])
	Fish LC50 Psetta maxima: 833 mg/L (96 hr)
	Aquatic Invertebrates EC50 Daphnia magna: >143 mg/L (48 hr [mobility])
Phenyl bis(2,4,6-trimethylbenzoyl)-phosphine oxide	Aquatic Plants EC50 Green algae: >0.26 mg/L (72 hr [growth rate])
	Fish LC50 Freshwater fish: >0.09 mg/L (96 hr)
	Aquatic Invertebrates EC50 Not specified: >1.175 mg/L (48 hr [mobility])

Chronic (long-term) toxicity

Assessment: Based on available data, the classification criteria are not met.

Product data: No data available.

Substance data:

Name	Result
Isobornyl methacrylate	Aquatic Invertebrates EC50 Daphnia magna: 0.658 mg/L (21 d [reproduction])
Urethane Dimethacrylate	Aquatic Plants NOEC Desmodesmus subspicatus: 0.21 mg/L (72 hr)

Persistence and degradability

Product data: No data available.
Substance data:

Name	Result
Urethane Dimethacrylate	The substance is not readily biodegradable (22% degradation in 28 days).
Phenyl bis(2,4,6-trimethylbenzoyl)-phosphine oxide	This substance is not readily biodegradable. No degradation was observed during 28 day test period.
Methacrylic acid, monoester with propane-1,2-diol	The substance is readily biodegradable. 81% degradation in water, measured by BOD, after 28 days.
Isobornyl methacrylate	The substance is readily biodegradable. 70% degradation in water, measured by CO2 evolution, after 28 days.

Bioaccumulative potential

Product data: No data available.
Substance data:

Name	Result
Methacrylic acid, monoester with propane-1,2-diol	Low potential to bioaccumulate (BCF: 3.2; Log kow: 1.21)
Phenyl bis(2,4,6-trimethylbenzoyl)-phosphine oxide	Bioaccumulation is not expected. BCF (aquatic species): 5 dimensionless
Isobornyl methacrylate	Bioaccumulation can be assumed based on a log Pow value of 5.09. However, due to expected rapid metabolism and non-bioaccumulative potential of the metabolites, bioaccumulation in organisms is not expected.

Mobility in soil

Product data: No data available.
Substance data:

Name	Result
Phenyl bis(2,4,6-trimethylbenzoyl)-phosphine oxide	Based upon the log Koc of 3.85 an adsorption to the soil is expected.
Urethane Dimethacrylate	The substance has moderate potential to adsorb to organic soil and sediment particles (log Koc: 3.66 dimensionless).
Methacrylic acid, monoester with propane-1,2-diol	The substance has a low potential for adsorption to soil or sediments based on high water solubility, a low vapor pressure (0.11 hPa @ 20 deg C), and low log Kow (0.97).
Isobornyl methacrylate	The substance is slightly mobile in soil with a high potential for adsorption to soil and sediment. Log Koc: 3.71

Results of PBT and vPvB assessment

Product data:

PBT assessment: This product does not contain any substances that are assessed to be a PBT.
vPvB assessment: This product does not contain any substances that are assessed to be a vPvB.

Substance data:

PBT assessment:

Urethane Dimethacrylate	This substance is not PBT.
Methacrylic acid, monoester with propane-1,2-diol	The substance is not PBT.

Isobornyl methacrylate	This substance in not PBT
Phenyl bis(2,4,6-trimethylbenzoyl)-phosphine oxide	This substance is not PBT.

vPvB assessment:

Urethane Dimethacrylate	This substance is not vPvB.
Methacrylic acid, monoester with propane-1,2-diol	The substance is not vPvB.
Isobornyl methacrylate	This substance is not vPvB
Phenyl bis(2,4,6-trimethylbenzoyl)-phosphine oxide	This substance is not vPvB.

Other adverse effects: No data available.

SECTION 13: Disposal considerations

Disposal methods:

Do not discharge into public wastewater or surface waters. It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities.

Contaminated packages:

Dispose contaminated packages in a safe manner in accordance with local and national regulations. Do not allow the product to be released into the environment.

SECTION 14: Transport information

Australian Dangerous Goods (ADG)

UN number	Not regulated
UN proper shipping name	Environmentally hazardous liquid, N.O.S. Urethane dimethacrylate
UN transport hazard class(es)	9 
Packing group	III
Environmental hazards	Marine Pollutant
Special precautions for user	None
Additional Information	This product is not regulated as a dangerous good when transported in sizes of ≤5L or ≤5 kg provided the packaging meets the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8.

International Maritime Dangerous Goods (IMDG)

UN number	UN 3082
UN proper shipping name	Environmentally hazardous liquid, N.O.S. Urethane dimethacrylate
UN transport hazard class(es)	9 
Packing group	III
Environmental hazards	Marine Pollutant

Special precautions for user	None
Additional Information	This product is not regulated as a dangerous good when transported in sizes of ≤5L or ≤5 kg provided the packaging meets the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8.

International Air Transport Association Dangerous Goods Regulations (IATA-DGR)

UN number	UN 3082
UN proper shipping name	Environmentally hazardous liquid, N.O.S. Urethane dimethacrylate
UN transport hazard class(es)	9 
Packing group	III
Environmental hazards	Marine Pollutant
Special precautions for user	None
Additional Information	This product is not regulated as a dangerous good when transported in sizes of ≤5L or 5≤ kg provided the packagings meet the general provisions of 5.0.2.4.1, 5.0.2.6.1 and 5.0.2.8.

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	
Bulk Name	None
Ship type	None
Pollution category	None

SECTION 15: Regulatory information

Australia regulations

Australian Inventory of Chemical Substances (AICS): All ingredients are listed or exempt.

Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP):

Ingredient Name	CAS	Schedules
Urethane Dimethacrylate	72869-86-4	Not Applicable

Additional information: Not determined.

SECTION 16: Other information

Abbreviations and Acronyms: None

Disclaimer:

This SDS was authored in accordance with the Australian Work Health and Safety Regulations and supplemented by the Australian Code of Practice on the Preparation of Safety Data Sheets for Hazardous Chemicals. The information provided in this SDS is correct, to the best of our knowledge, based on information available. The information given is designed only as a guidance for safe handling, use, storage, transportation and disposal and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials, unless specified in the text. The responsibility to provide a safe workplace remains

with the user.

Initial preparation date: 12.01.2022

Revision date:

End of Safety Data Sheet