

## Safety Data Sheet

According to OSHA Hazard Communication Standard, 29 CFR 1910.1200

Initial preparation date: 02.24.2020

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### Tough 2000 Resin

#### SECTION 1: Identification

##### Product identifier

**Product name:** Tough 2000 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:**

**United States**

Formlabs, Inc

35 Medford St

Suite 201 Somerville, MA 02143

6178550762

sds@formlabs.com

##### Emergency telephone number:

**United States**

CHEMTREC

1-800-424-9300 (24 Hours)

#### 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

Chronic aquatic hazard, category 2

##### 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

H411 Toxic to aquatic life with long lasting effects

##### Precautionary statements:

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P264 Wash skin thoroughly after handling  
P280 Wear protective gloves/protective clothing/eye protection/face protection  
P261 Avoid breathing dust/fume/gas/mist/vapors/spray  
P272 Contaminated work clothing must 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 it 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/doctor 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/information on ingredients

Identification	Name	Weight %
CAS number: Trade Secret	Urethane dimethacrylate	45-65
CAS number: Trade Secret	Methacrylate Monomer(s)	15-25
CAS number: Trade Secret	Methacrylate Monomer(s)	10-20
CAS number: Trade Secret	Photoinitiator(s)	<0.6

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:

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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:

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

If respiratory symptoms persist, seek medical attention.

##### Notes for the doctor:

Treat symptomatically.

### SECTION 5: Firefighting measures

#### Extinguishing media

##### Suitable extinguishing media:

Alcohol- resistant foam, Dry chemical or Carbon dioxide

##### Unsuitable extinguishing media:

None known

Do not use water jet as an extinguisher.

#### Specific hazards during fire-fighting:

Evacuate all personnel to a predetermined safe location, no less than 2,500 feet in all directions. Can explode or detonate under fire conditions. Burning material may produce toxic vapors.

#### Special protective equipment for firefighters:

Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA)

#### Special precautions:

Avoid inhaling gases, fumes, mist, dust, vapor or aerosols. Avoid contact with eyes, skin, hair or clothing.

### SECTION 6: Accidental release measures

#### Personal precautions, protective equipment and emergency procedures:

Wear respiratory protection. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. For personal protection see section 8.

#### Environmental precautions:

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the

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environment must be avoided.

### Methods and material for containment and cleaning up:

Contain and soak up spill with absorbent that does not react with spilled product. Place used absorbent into suitable, covered, labelled containers for disposal.

### Reference to other sections:

For disposal see section 13.

## SECTION 7: Handling and storage

### Precautions for safe handling:

Avoid contact with skin, eyes, and clothing. Follow good hygiene procedures when handling chemical materials. Refer to Section 8. Follow proper disposal methods. Refer to Section 13. Do not eat, drink, smoke, or use personal products when handling chemical substances.

### Conditions for safe storage, including any incompatibilities:

Store in a cool, dry, well ventilated place. Store away from sources of heat or ignition. Store away from incompatible materials described in Section 10. Keep containers closed when not in use

## SECTION 8: Exposure controls/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:

Effective ventilation in all processing areas.

Use local exhaust ventilation to maintain airborne concentrations below the TLV.

### Personal protection equipment

#### Eye and face protection:

Safety goggles or safety glasses with side shields

#### Skin and body protection:

Impervious clothing and chemical resistant gloves

#### Respiratory protection:

In case of insufficient ventilation, wear suitable respiratory protection

### General hygienic measures:

Handle in accordance with good industrial hygiene and safety measures. Wash hands and face after handling chemical products. Wash hands before eating, drinking and smoking. Wash hands at the end of the workday.

## SECTION 9: Physical and chemical properties

### Information on basic physical and chemical properties

Appearance	Grey Liquid
Odor	Characteristic acrylate
Odor threshold	Not determined or not available.
pH	Not determined or not available.

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Melting point/freezing point	Not determined or not available.
Initial boiling point/range	> 100°C
Flash point (closed cup)	> 93.5°C
Evaporation rate	Not determined or not available.
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/cm <sup>3</sup>
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.

#### Other information

#### SECTION 10: Stability and reactivity

##### Reactivity:

Stable and non-reactive under normal conditions of use, storage and transport.

##### Chemical stability:

Stable under normal storage and handling conditions.

##### Possibility of hazardous reactions:

Under normal conditions of storage and use, hazardous reactions will not occur.

##### Conditions to avoid:

Incompatible materials.

Avoid storage >38°C (100°F) and exposure to light/direct sunlight and heat.

##### Incompatible materials:

Strong oxidizing agents.

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: Toxicological information

##### Acute toxicity

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

**Product data:** No data available.

**Substance data:**

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Name	Route	Result
Methacrylate Monomer(s)	oral	LD50 Rat: >2000 mg/kg
		LD50 Rat: >2000 mg/kg
	dermal	LD50 Rabbit : >5000 mg/kg
		LD50 Rabbit: >3000 mg/kg

#### Skin corrosion/irritation

**Assessment:**

Causes skin irritation.

**Product data:**

No data available.

**Substance data:**

Name	Result
Methacrylate Monomer(s)	Causes skin irritation

#### Serious eye damage/irritation

**Assessment:**

Causes serious eye irritation.

**Product data:**

No data available.

**Substance data:**

Name	Result
Methacrylate Monomer(s)	Causes serious eye irritation.
	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.
Methacrylate Monomer(s)	May cause an allergic skin reaction.
Photoinitiator(s)	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):** None of the ingredients are listed.

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

**OSHA Carcinogens:** Not applicable

#### Germ cell mutagenicity

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

**Product data:**

No data available.

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**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
Methacrylate Monomer(s)	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
Methacrylate Monomer(s)	LC50 Danio rerio: 1.79 mg/L (96 hours)
	EC50 Daphnia magna: 2.57 mg/L (48 hours)

### Chronic (long-term) toxicity

**Assessment:** Toxic to aquatic life with long lasting effects.

**Product data:** No data available.

**Substance data:**

Name	Result
Methacrylate Monomer(s)	NOEC Daphnia magna: 0.233 mg/L (21 days)

### Persistence and degradability

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**Product data:** No data available.

**Substance data:**

Name	Result
Urethane dimethacrylate	This substance is not readily biodegradable.
Methacrylate Monomer(s)	This substance is readily biodegradable.
Methacrylate Monomer(s)	Readily biodegradable
Photoinitiator(s)	This substance is not readily biodegradable.

### Bioaccumulative potential

**Product data:** No data available.

**Substance data:**

Name	Result
Methacrylate Monomer(s)	The substance has low potential to bioaccumulate because of log Kow value (0.97 at 20 deg C).
Photoinitiator(s)	Bioaccumulation in organisms is not to be expected.

### Mobility in soil

**Product data:** No data available.

**Substance data:**

Name	Result
Urethane dimethacrylate	This substance is expected to disturb between the water column and organic soil and sediment particles.
Methacrylate Monomer(s)	The substance has a low potential for adsorption to soil.
Photoinitiator(s)	Based upon the log Koc of 3.85 an adsorption to the soil is expected.

**Other adverse effects:** No data available.

## SECTION 13: Disposal considerations

### Disposal methods:


It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities

### Contaminated packages:

Not determined or not applicable.

## SECTION 14: Transport information

### United States Transportation of dangerous goods (49 CFR DOT)

UN number	UN 3082
UN proper shipping name	Environmentally hazardous liquid, N.O.S. Methacrylate Polymer
UN transport hazard class(es)	9 
Packing group	III
Environmental hazards	Marine Pollutant
Special precautions for user	None
Additional Information	DOT: 49 CFR 171.4(c)(2) Not regulated as dangerous goods when transported in single or inner packaging of 5 L or less for liquids or net mass of 5 Kg or less for solids provided the packaging meets the requirements of 49 CFR 173.24(a)



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### Tough 2000 Resin

#### International Maritime Dangerous Goods (IMDG)

UN number	UN 3082
UN proper shipping name	Environmentally hazardous liquid, N.O.S. Methacrylate Polymer
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. Methacrylate Polymer
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

### SECTION 15: Regulatory information

#### United States regulations

##### Inventory listing (TSCA):

Trade Secret	Urethane dimethacrylate	Listed
Trade Secret	Methacrylate Monomer(s)	Listed
Trade Secret	Methacrylate Monomer(s)	Listed
Trade Secret	Photoinitiator(s)	Listed

Significant New Use Rule (TSCA Section 5): Not determined.

Export notification under TSCA Section 12(b): Not determined.

SARA Section 302 extremely hazardous substances: Not determined.

##### SARA Section 313 toxic chemicals:

Trade Secret	Urethane dimethacrylate	Not Listed
Trade Secret	Methacrylate Monomer(s)	Not Listed
Trade Secret	Methacrylate Monomer(s)	Not Listed

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Trade Secret	Photoinitiator(s)	Not Listed
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CERCLA: Not determined.

RCRA: Not determined.

Section 112(r) of the Clean Air Act (CAA): Not determined.

### Massachusetts Right to Know:

Trade Secret	Urethane dimethacrylate	Not Listed
Trade Secret	Methacrylate Monomer(s)	Not Listed
Trade Secret	Methacrylate Monomer(s)	Not Listed
Trade Secret	Photoinitiator(s)	Not Listed

### New Jersey Right to Know:

Trade Secret	Urethane dimethacrylate	Not Listed
Trade Secret	Methacrylate Monomer(s)	Not Listed
Trade Secret	Methacrylate Monomer(s)	Not Listed
Trade Secret	Photoinitiator(s)	Not Listed

### New York Right to Know:

Trade Secret	Urethane dimethacrylate	Not Listed
Trade Secret	Methacrylate Monomer(s)	Not Listed
Trade Secret	Methacrylate Monomer(s)	Not Listed
Trade Secret	Photoinitiator(s)	Not Listed

### Pennsylvania Right to Know:

Trade Secret	Urethane dimethacrylate	Not Listed
Trade Secret	Methacrylate Monomer(s)	Not Listed
Trade Secret	Methacrylate Monomer(s)	Not Listed
Trade Secret	Photoinitiator(s)	Not Listed

California Proposition 65: None of the ingredients are listed.

## SECTION 16: Other information

Abbreviations and Acronyms: None

### Disclaimer:

This product has been classified in accordance with OSHA HCS 2012 guidelines. The information provided in

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**Tough 2000 Resin**

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.

**NFPA:** 0-0-0

**HMIS:** 0-0-0

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**End of Safety Data Sheet**