

Safety Data Sheet

According to Regulation (EC) No. 1272/2008 (CLP) and (EC) No. 1907/2006 (REACH)

Initial preparation date: 2020.03.02

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Tough Resin

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Product Name: Tough Resin

Product code: FLTOTL05

1.2 Relevant identified uses of the substance or mixture and uses advised against

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.

1.3 Details of the manufacturer/supplier of the safety data sheet

Manufacturer:

United States

Formlabs, Inc

35 Medford St

Suite 201 Somerville, MA 02143

+1 617 855 0762

sds@formlabs.com

Supplier:

Germany

Formlabs GmbH

Nalepastr. 18

12459 Berlin

+49 30 555 795 880

1.4 Emergency telephone number:

1-800-424-9300 (24/7)

SECTION 2: Hazard(s) identification

2.1 Classification of the substance or mixture:

Classification according to Regulation (EC) No. 1272/2008 (CLP):

Skin irritation, category 2

Eye Irritation, category 2

Skin sensitization, category 1

Chronic aquatic hazard, category 2

Hazard-determining components of labeling:

Methacrylate Monomer(s)

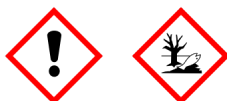
Urethane Dimethacrylate

Additional Information: None

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 (CLP)

Hazard pictograms:



Signal word: Warning

Hazard statements:

H315 Causes skin irritation

H319 Causes serious eye irritation

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H317 May cause an allergic skin reaction

H411 Toxic to aquatic life with long lasting effects

Precautionary statements:

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 should not be allowed out of the workplace

P273 Avoid release to the environment

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

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

P391 Collect spillage

P501 Dispose of contents/container in accordance with local/regional/national regulations

2.3 Other hazards: None known

SECTION 3: Composition/information on ingredients

3.1 Substance: Not applicable.

3.2 Mixture:

Identification	REACH Registration No.	Name	Classification according to Regulation (EC) No. 1272/2008 (CLP)	Weight %
CAS number: Trade Secret EC number: Trade Secret	-	Methacrylate Monomer(s)	Skin Sens. 1; H317 Eye Irrit. 2; H319 Skin Irrit. 2; H315	25-45
CAS number: 72869-86-4 EC number: 276-957-5	-	Urethane Dimethacrylate	Skin Sens. 1; H317	55-75

Additional information: None

Full Text of H and EUH statements: See section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General notes:

Show this Safety Data Sheet to the doctor in attendance.

Following inhalation:

Remove source of exposure or move person to fresh air and keep comfortable for breathing. If experiencing respiratory symptoms: Call a POISON CENTER or doctor.

Following skin contact:

Wash off immediately with soap and plenty of water while removing contaminated clothing and shoes. Continue rinsing for at least 15 minutes. See a physician if irritation persists.

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Following eye contact:

Immediately flush eyes, under eyelids with water for 15 minutes. Remove contact lenses, if easy to do so. Protect unexposed eye. Continue rinsing on the way to hospital.

Following ingestion:

If swallowed, DO NOT induce vomiting unless told to do so by physician or poison control center. Rinse mouth with water. Never give anything to drink to an unconscious person. Seek medical advice.

Self-Protection of the first aider:

Not determined or not available.

4.2 Most important symptoms and effects, both acute and delayed

Acute symptoms and effects:

Skin: Symptoms may cause irritation, redness, pain and rash. Respiratory: Symptoms may include difficulty breathing, coughing, wheezing and tightness/closure of airway.

Delayed symptoms and effects:

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

4.3 Indication of any immediate medical attention and special treatment needed

Specific treatment:

None known.

Notes for the doctor:

Treat symptomatically.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media:

Alcohol- resistant foam, Dry chemical or Carbon dioxide

Unsuitable extinguishing media:

None known

5.2 Special hazards arising from the substance or mixture:

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.

5.3 Advice for firefighters

Personal protection equipment:

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

6.1 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.

6.2 Environmental precautions:

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

6.3 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.

6.4 Reference to other sections:

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For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling:

Wear gloves and eye protection when handling, moving or using this product. Do not contaminate water, food, or feed by storage or disposal.

7.2 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

7.3 Specific end use(s):

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection



8.1 Control parameters

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).

Derived No Effect Level (DNEL):

Ingredient Name: Methacrylate Monomer(s)

CAS #: Trade Secret

Workers - Systemic Effects	Acute - Oral	Not determined or not applicable.
	Acute - Inhalation	No hazard identified
	Acute - Dermal	No hazard identified
	Chronic - Oral	Not determined or not applicable.
	Chronic - Inhalation	14.7 mg/m ³
	Chronic - Dermal	4.2 mg/kg bw/day
Workers - Local Effects	Acute - Oral	Not determined or not applicable.
	Acute - Inhalation	No hazard identified
	Acute - Dermal	No hazard identified
	Chronic - Oral	Not determined or not applicable.
	Chronic - Inhalation	No hazard identified
	Chronic - Dermal	Hazard identified but no DNEL available

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General Population - Systemic Effects	Acute - Oral	No hazard identified
	Acute - Inhalation	No hazard identified
	Acute - Dermal	No hazard identified
	Chronic - Oral	2.5 mg/kg bw/day
	Chronic - Inhalation	8.8 mg/m ³
	Chronic - Dermal	2.5 mg/kg bw/day
General Population - Local Effect	Acute - Oral	Not determined or not applicable.
	Acute - Inhalation	No hazard identified
	Acute - Dermal	No hazard identified
	Chronic - Oral	Not determined or not applicable.
	Chronic - Inhalation	No hazard identified
	Chronic - Dermal	Hazard identified but no DNEL available

Predicted No Effect Concentration (PNEC):

Ingredient Name: Methacrylate Monomer(s)

CAS #: Trade Secret

Environmental Protection Target	PNEC
Fresh water	0.904 mg/L
Freshwater sediments	6.28 mg/kg
Marine water	0.904 mg/L
Marine sediments	6.28 mg/kg
Food chain	Not determined or not available.
Microorganisms in sewage treatment	10 mg/L
Soil (agricultural)	0.727 mg/kg
Air	No hazard identified

Information on monitoring procedures:

Not determined or not applicable.

8.2 Exposure controls

Appropriate engineering controls:

Effective ventilation in all processing areas.

Personal protection equipment

Eye and face protection:

Safety goggles or safety glasses

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.

Environmental exposure controls:

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation.

Product (substance / mixture) related measures to prevent exposure:	Not determined or not applicable.
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Instruction measures to prevent exposure:	Not determined or not applicable.
Organizational measures to prevent exposure:	Not determined or not applicable.
Technical measures to prevent exposure:	Not determined or not applicable.

Risk management measures to control exposure:

Not determined or not applicable.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance	Blue/Green Liquid
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	> 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 ³
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	890 cps @ 35°C
Kinematic viscosity	Not determined or not available.
Explosive properties	Not determined or not available.
Oxidizing properties	Not determined or not available.

9.2 Other information

SECTION 10: Stability and reactivity

10.1 Reactivity:

Does not react under normal conditions of use and storage.

10.2 Chemical stability:

Stable under normal storage and handling conditions.

10.3 Possibility of hazardous reactions:

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

10.4 Conditions to avoid:

Incompatible materials.

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

10.5 Incompatible materials:

Strong oxidizing agents.

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

10.6 Hazardous decomposition products:

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

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

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

Product data: No data available.

Substance data:

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

Skin corrosion/irritation

Assessment:

Causes skin irritation.

Product data:

No data available.

Substance data: No data available.

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.

Respiratory or skin sensitization

Assessment:

May cause an allergic skin reaction.

Product data:

No data available.

Substance data:

Name	Result
Methacrylate Monomer(s)	May cause an allergic skin reaction.
Urethane Dimethacrylate	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.

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International Agency for Research on Cancer (IARC): None of the ingredients are listed.

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

Product data:

No data available.

Substance data: No data available.

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

12.1 Toxicity

Acute (short-term) toxicity

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

Product data: No data available.

Substance data: No data available.

Chronic (long-term) toxicity

Assessment:

Toxic to aquatic life with long lasting effects.

Product data: No data available.

Substance data: No data available.

12.2 Persistence and degradability

Product data: No data available.

Substance data:

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Name	Result
Methacrylate Monomer(s)	This substance is readily biodegradable.
Urethane Dimethacrylate	This substance is not readily biodegradable.

12.3 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).

12.4 Mobility in soil

Product data: No data available.

Substance data:

Name	Result
Methacrylate Monomer(s)	The substance has a low potential for adsorption to soil.
Urethane Dimethacrylate	This substance is expected to distribute between the water column and organic soil and sediment particles.

12.5 Results of PBT and vPvB assessment

PBT assessment:

Methacrylate Monomer(s)	This substance is not PBT.
Urethane Dimethacrylate	This substance is not PBT.

vPvB assessment:

Methacrylate Monomer(s)	This substance is not vPvB.
Urethane Dimethacrylate	This substance is not vPvB.

12.6 Other adverse effects: No data available.

12.7 Hazard to the ozone layer

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

Product data: No data available.

Substance data: No data available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

13.1.1 Product / Packaging disposal: Not determined or not available.

Waste codes / waste designations according to LoW: Not determined or not available.

13.1.2 Waste treatment-relevant information: Not determined or not available.

13.1.3 Sewage disposal-relevant information: Not determined or not available.

13.1.4 Other disposal recommendations: It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities

SECTION 14: Transport information

International Carriage of Dangerous Goods by Road/Rail (ADR/RID)

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


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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 Carriage of Dangerous Goods by Inland Waterways (ADN)

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 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	

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Special precautions for user	None
Additional Information	This product is not regulated as a dangerous good when transported in sizes of $\leq 5L$ or $5 \leq kg$ provided the packaging meets 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 MARPOL and the IBC Code	
Bulk Name	None
Ship type	None
Pollution category	None

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture.

European regulations

Inventory listing (EINECS):

Trade Secret	Methacrylate Monomer(s)	Listed
72869-86-4	Urethane Dimethacrylate	Listed

REACH SVHC candidate list:

Trade Secret	Methacrylate Monomer(s)	Not Listed
72869-86-4	Urethane Dimethacrylate	Not Listed

REACH SVHC Authorizations:

Trade Secret	Methacrylate Monomer(s)	Not Listed
72869-86-4	Urethane Dimethacrylate	Not Listed

REACH Restriction:

Trade Secret	Methacrylate Monomer(s)	Not Listed
72869-86-4	Urethane Dimethacrylate	Not Listed

Water hazard class (WGK) (Product):

Water hazard class (WGK) (Substance):

Ingredient Name	CAS	Class
Methacrylate Monomer(s)	Trade Secret	Water hazard class 1: slightly hazardous to water
Urethane Dimethacrylate	72869-86-4	Water hazard class 1: slightly hazardous to water

Other regulations

Germany TA Luft:

Ingredient Name	CAS	Class	Base Emission Rate	Max Concentration
Methacrylate Monomer(s)	Trade Secret	Not Applicable		
Urethane Dimethacrylate	72869-86-4	Not Applicable		

15.2 Chemical Safety Assessment

No Chemical Safety Assessment has been carried out for this substance/mixture by the supplier.

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SECTION 16: Other information

Abbreviations and Acronyms: None

Classification procedure:

Classification according to Regulation (EC) No. 1272/2008 (CLP)	Method Used
Skin irritation, category 2	Calculation method
Eye Irritation, category 2	Calculation method
Skin sensitization, category 1	Calculation method
Chronic aquatic hazard, category 2	Calculation method

Summary of classification(s) in section 3:

Skin Sens. 1	Skin sensitization, category 1
Eye Irrit. 2	Eye Irritation, category 2
Skin Irrit. 2	Skin irritation, category 2
Aquatic Chronic 2	Chronic aquatic hazard, category 2

Summary of hazard statements in section 3:

H317	May cause an allergic skin reaction
H319	Causes serious eye irritation
H315	Causes skin irritation
H411	Toxic to aquatic life with long lasting effects

Disclaimer:

This product has been classified in accordance with EC No. 1272/2008 (CLP) and EC No. 1907/2006 (REACH). 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.

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End of Safety Data Sheet