



Photoreactive Resin for Material Jetting Printers

SAFETY DATA SHEET

Prepared: 06/01/2016

Revised: 06/02/2016

GHS Labelling
Hazard pictograms:



GHS07

GHS09

Signal word: Warning

GHS FORMAT

1. Chemical Product and Company Identification

Product Identification: Photoreactive Resin for Stereolithography Printing
Product Class: Mixture of Acrylates, photoinitiators, and proprietary pigment package
Product Use: For use in Engineering Grade Stereolithography 3D Printers
Company: Molecule Digital LLC
5110 Port Chicago Hwy
Suite A
Concord, CA 94520
Date of Preparation: 5/23/2016
For Emergencies: Globally Call: +1 925 405 6606

2. Hazards Identification in Accordance with EC 1272/2008

EMERGENCY OVERVIEW

COLOR: Cyan, Magenta, Yellow, Black, White, Clear, Custom

PHYSICAL STATE: LIQUID

ODOR: SLIGHT ACRYLIC

*Classification of the substance or mixture:

Acute toxicity – Oral, Category 4

Skin irritation, Category 2

Eye irritation, Category 2A

Target Organ Systemic Toxicity, Respiratory System, Category 3

Skin Sensitization, Category 1B

*For the full text of the H-Statements mentioned in this Section, see Section 16.

GHS/CLP LABELLING

Hazard pictograms:



GHS07

GHS09

SIGNAL WORD: WARNING

HAZARD STATEMENTS

H315 Causes skin irritation
H317 May cause an allergic skin reaction
H319 Causes serious eye irritation
H335 May cause respiratory irritation
H411 Harmful to aquatic life with long lasting effects

PRECAUTIONARY STATEMENT(S)

Prevention:

P202	Do not handle until all safety precautions have been read and understood
P261	Avoid breathing gas/mist/vapors/spray
P264	Wash skin thoroughly after handling
P270	Do not eat, drink or smoke when using this product
P272	Contaminated work clothing should not be allowed out of the workplace
P273	Avoid release into the environment
P280	Wear protective gloves/protective clothing/eye protection/face protection

Response:

P302 + P352:	IF ON SKIN (or hair): 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 attention/advice.
P310:	IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P333 + P313:	IF SKIN IRRITATION OR RASH OCCURS: Get medical advice/attention.
P362:	Take off contaminated clothing and wash before reuse.
P391:	Collect spillage.
P501	Dispose of contents/container in accordance with local/regional/national/international regulations.

SUPPLEMENTAL HEALTH INFORMATION

Potential Health Effects:

Effects due to processing releases:

Irritating to eyes, respiratory system and skin. Prolonged or repeated exposure may cause: headache, drowsiness, nausea weakness (severity of effects depends on extent of exposure).

Other:

This product may release fume and/or vapor of variable composition depending on processing time and temperature. Possible cross sensitization with other acrylates and methacrylates or any other source of free radical such as high heat.

3. Composition/Information on Ingredient

Component	Approximate % by weight	CAS # & EINECS #	Hazardous Statements in accordance with EC 1272/2008	EU Classification according to Directive 67/548/ECC
A. Acrylate oligomers	Proprietary	Proprietary	H315, H319, H335	Xi; Irritant, R36/37/38, R43 S3, S7/9, S20, S26, S29, S37/39
B. Acrylate monomers	Proprietary	Proprietary	H315, H317, H319, H411	Xi; Irritant, R36/37/38, R43 S3, S7/9, S20, S26, S29, S37/39
C. Photoinitiator(s)	Proprietary	Proprietary	H303, H402, H412	S3, S7/9, S20, S26, S29, S37/39

* Toxic chemical subject to the reporting requirements of section 313 of Title III and of 40 CFR 372.

"WARNING: THIS PRODUCT CONTAINS CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER AND BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM."

4. First-Aid Measures

Emergency Overview: This product is a liquid with a characteristic acrylate odor. This product may cause skin and eye irritation. The inhalation of high vapor concentration may cause a headache and nausea. There is no data available on the mixture itself. Procedure used to derive the classification according to Regulation (EC) No 1272/2008[CLP/GHS] See Sections 2 and 3 for details. This takes into account,

where known, delayed and immediate effects and also chronic effects of components from short term and long term exposure by oral, inhalation and dermal routes of exposure and eye contact. Acrylate components of the mixture have irritating properties. May be harmful or fatal if swallowed and enters airways.

Inhalation: In case of exposure to a high concentration of vapor or mist, remove person to fresh air. If breathing has stopped, administer artificial respiration and seek medical attention.

Eye Contact: Immediately flush with plenty of clean water (under eye lids) for at least 20 minutes. Hold eyelids apart to ensure flushing. Washing within one minute of contact is essential to achieve maximum effectiveness. Seek medical attention immediately.

Do not apply oil or oily ointments unless ordered by a physician.

Skin Contact: Remove contaminated clothing and rinse contact area thoroughly with soap and water. Particular attention should be paid to hair, nose, and ears, and other areas not easily cleaned. Wash clothing before reuse. If irritation develops, consult a physician.

Ingestion: Contact nearest Poison Control Center or local emergency telephone number for assistance and instructions. If ingested, dilute with water by giving glasses of water or milk to the victim. Do not give anything by mouth if the victim is rapidly losing consciousness, is unconscious, or convulsing. Do not induce vomiting. If vomiting occurs naturally, keep airways clear. Get medical attention. Provide an estimate of the time at which the material was ingested and the amount of the substance that was swallowed.

Note to Physician: Persons with pre-existing central nervous system (CNS) disease, neurological conditions, skin disorders, chronic respiratory diseases or impaired liver or kidney function should avoid exposure.

5. Fire-Fighting Measures

Flash Point: > 93 °C / 200 °F

Method: Setaflash

VOC (g/l): Theoretically very close to zero at normal ambient conditions

Ignition Temperature: No data

Lower Explosion Limit: No data

Upper Explosion Limit: No data

Extinguishing Media: Use carbon dioxide or dry chemical for small fires; aqueous foam or water spray for large fires.

Special Firefighting Procedures: Firefighters should wear full protection clothing and self-contained breathing apparatus (SCBA). Thoroughly decontaminate firefighting equipment including all firefighting apparel after the incident.

Unusual Fire & Explosion: Emits irritating vapors. High temperatures, accidental impurities, or exposure to radiation or oxidizers may cause spontaneous polymerization generating heat/pressure and rupture/explosion of closed containers. Burning produces obnoxious and toxic fumes.

Exposure Hazard(s): Material — Irritant

When burned, the following hazardous products of combustion can occur:

Carbon oxides

Nitrogen Oxides (NO_x)

Hazardous organic compounds

6. Accidental Release Measures

Procedures of Personal Precautions: Wear adequate personal protective clothing and equipment, as outlined in Section 8.

Environmental Precautions: Contain spill to prevent spread into drains, sewers, water supplies, or soil. Avoid release into the environment. Dispose of in accordance with all applicable federal, state and local regulations.

Methods of Cleaning up: In the event of a spill, immediately remove all sources of ignition. Cover the liquid with inert absorbent.

Using appropriate personal protective equipment and non-sparking tools, contain spilled material.

Waste Disposal Method: Do not dispose of in sewers, lakes, rivers or streams. Scoop all contaminated material into compatible bottles or drums for proper disposal. Dispose of in accordance with all applicable federal, state and local regulations. National or regional provisions may also be in force.

7. Handling and Storage

Handling Precautions: User Exposure — This product should be used in well-ventilated areas. Product may cause irritation. Avoid contact with eyes. Avoid prolonged or repeated contact with skin. Wash hands with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet facilities. Eating, drinking and smoking should be prohibited in areas where this material is handled, stored or processed. Launder contaminated clothing before reuse. Contaminated leather articles, including shoes, cannot be decontaminated and should be destroyed to prevent reuse. Solvents should never be used to clean hands or skin because they increase the penetration of the material into skin. Do not enter storage areas and confined spaces unless adequately ventilated

Storage Precautions: Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool, and well-ventilated area, away from incompatible materials and food and drink. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate contaminant to avoid environmental contamination

Special Requirements: Do not heat containers with steam or electrical equipment. Heating this product above 150 °C (300 °F) in the presence of air may cause slow oxidative decomposition; above 260 °C (500 °F) polymerization may occur. Fumes and vapors from this thermal decomposition may be dangerous (carbon monoxide, carbon dioxide, nitrous oxides). Do not breathe fumes.

8. Exposure Controls & Personal Protection

EXPOSURE LIMITS

Component	HSIS Australia	IOELVs (UK)	ACGIH TLV	OSHA PEL	WEEL
A. Acrylate oligomers	None	None	None	None	None
B. Acrylate monomers	None	None	None	None	None
C. Photoinitiator(s)	None	None	None	None	None

No occupational exposure limit values exist for the materials contained in this product.

EXPOSURE CONTROLS

Engineering Controls: Ensure adequate ventilation. Where reasonably practicable, this should be achieved by the use of local exhaust ventilation and good general extraction. If this are not sufficient to maintain concentrations of particulates and solvent vapors below the OEL, suitable respiratory protection must be worn.

Respiratory Protection: Respirators are generally not needed under normal conditions of use. If this material is handled at elevated temperature, under mist forming conditions or in case of accidental release of large quantities of product use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Protective Gloves: Wear impervious gloves (nitrile or neoprene) for routine handling. Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

RadTech recommends the following glove specifications for UV Acrylate systems:

Single use: disposable, unpowdered, nitrile gloves: Use for short duration exposures not exceeding 30 minutes, in situations where only splashes are likely. Do not use where mechanical resistance is required or where puncturing or tearing of the gloves is likely to occur. Replace immediately if punctured, degraded or tearing of the gloves has occurred.

General use: minimum 0.45mm thick, unlined, unpowdered, natural rubber latex free nitrile gloves: Use for longer duration exposure (up to 4 hours for most UV/EB curing acrylates) or mechanical handling activities. Replace immediately when punctured or when a change of appearance (color, elasticity, shape) occurs

Heavy duty: unlined, natural rubber latex-free nitrile gloves: Use when handling solvents. Avoid the use of chlorinated solvents and limit the use of ketones (e.g. acetone, MEK, MIBK) and ethyl and butyl acetates, as they may accelerate glove deterioration.

Eye and Face Protection: Chemical splash goggles or a face shield is recommended during operations where splashing could occur. Wear protective eyewear (e.g., safety glasses with side-shield) at all times when handling this product. Always use protective eyewear when cleaning spills or leaks. Contact lenses pose a special hazard; soft lenses may absorb and concentrate irritants.

Skin Protection: Avoid all skin contact. Depending on the conditions of use, cover as much of the exposed skin area as possible by wearing gloves, aprons, long pants, and long sleeved shirts.

Other Controls: For operations where contact can occur a safety shower and eye wash facility should be available. Always use good personal hygiene and housekeeping practices. Wash hands thoroughly after handling.

Environmental Exposure Controls: Keep product from waterways and watersheds. This substance is not readily biodegradable and is dangerous for the environment. Avoid release into the environment.

9. Physical & Chemical Properties

Appearance: Liquid, blue color

Odor: Characteristic/Acrylate

	Value	Units	Method
Specific Gravity	109-122	g/cm ²	None
Boiling Point	> 100	C	None
Flash Point	> 100	C	None
Ignition Temperature	No Data	C	
Lower Explosion Limit	No Data		None
Upper Explosion Limit	No Data		None
Viscosity	250-325	cps	25C (77F)

Vapor Pressure: 20 mgHg@`40C

Solubility in Water: Only very slightly soluble

Solubility in Organic Solvents: Soluble or swellable in many organic solvents

Volatile Characteristics: Negligible in normal conditions (increased temperature will increase volatility)

Electrostatic Discharge: Safe

Electric Conductivity: Dielectric

10. Stability and Reactivity

Stability: Stable when stored in original container designed for use with light sensitive materials under 35 °C (95 °F) in dark, cool place.

Conditions to Avoid: Storage > 38 °C (100 °F), exposure to light, loss of dissolved air, and contamination with incompatible materials.

Incompatible Materials to Avoid: Polymerization initiators, including peroxides, strong oxidizing agents, alcohols, copper, copper alloys, carbon steel, iron, rust, and strong bases.

Hazardous Decomposition Products: Hazardous decomposition products may include oxides of carbon, nitrogen and various hydrocarbon fragments.

Hazardous Polymerization: Hazardous polymerization may occur. Uncontrolled polymerization may cause rapid evolution of heat and increase in pressure that could result in violent rupture of sealed storage vessels or containers.

11. Toxicological Information

Component	Toxicity	Value	Quantity	Units	Source
A. Acrylate oligomers	Practically nontoxic		Not a hazardous substance or mixture		Vendor Literature

B. Acrylate monomers	Acute Oral Toxicity	LD50>	3000	mg/kg body weight	Vendor Literature
C. Photoinitiator(s)	Acute Oral Toxicity	LD50>	2500	mg/kg body weight	Vendor Literature

Individual components of this product are not reported to produce mutagenic effects in humans. None of the components of this material are listed by IARC, NTP, OSHA or ACGIH as carcinogens.

12. Ecological Information



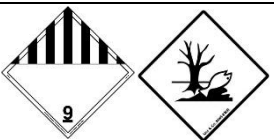
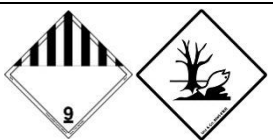
Keep product from waterways and watersheds. This substance is not readily biodegradable. Dispose of in accordance with all applicable federal, state and local regulations.

13. Disposal Considerations

Dispose of in accordance with governmental regulations (community, national or regional). Contact a licensed professional waste disposal service to dispose of this mixture. As with all foreign substances, do not allow to enter storm or sewer drainage systems. Avoid release into the environment.

Contaminated Packaging: Dispose of as unused product. Expose the open emptied container to light until material has solidified, then dispose. If material is not solid then container must be dispose of according to local regulations.

14. Transport Information

	DOT	IATA	IMDG	ADR/RID
UN Number	UN3077	UN3077	UN3077	UN3077
Proper Shipping Name	Environmentally hazardous substance, Liquid, n.o.s. (Acrylates)	Environmentally hazardous substance, Liquid, n.o.s. (Acrylates)	Environmentally hazardous substance, Liquid, n.o.s. (Acrylates)	Environmentally hazardous substance, Liquid, n.o.s. (Acrylates)
Hazard Class	9	9	9	9
Subsidiary Class	NA	NA	NA	NA
Packing Group	III	III	III	III
Labels Required				
ERG Guide Number	171	171	171	171
EmS Code	NA	NA	F-A, S-F	NA
ORM-D authorized?	≤ 5 liters (49CFR 173.150)			

15. Regulatory Information

The following provides a summary of the legal requirements.

FULL TEXT OF ANY R-PHRASES AND S-PHRASES:

Risk Phrases:

R36/37/38 Irritating to eyes, respiratory system and skin
R43 May cause sensitization by skin contact

Safety Phrases:

S3 Keep in a cool place
S7/9 Keep container
S20 When using do not eat or drink

S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
 S29 Do not empty into drains
 S36 Wear suitable protective clothing
 S37/39 Wear suitable gloves and eye/face protection

California Proposition 65: "WARNING: This product contains chemicals known to the state of California to cause birth defects or other reproductive harm."

	A. Acrylate oligomers	B. Acrylate monomers	C. Photoinitiator(s)
Sara Title III Listing			
Section 302/355 (extremely hazardous substance)	not subject to reporting	not subject to reporting	not subject to reporting
Section 311/312 (Hazard Category)	Acute Health Hazard	Reactivity Hazard, Acute Health Hazard	Chronic Health Hazard
Section 313 (toxic chemical listings)	not subject to reporting	not subject to reporting	not subject to reporting
Section 335 (extremely hazardous Substance)	not subject to reporting	not subject to reporting	
Chemical Inventory Status			
US TSCA Inventory (toxic substance control act)	listed	listed	listed
US TSCA 12(b) Export Notification	not listed		
EU EINECS/ELINCS	conforms to	conforms to	conforms to
Canadian Domestic Substance List (DSL/NDSL)	listed	listed	listed NDSL
China IESCS (CN)	conforms to	conforms to	conforms to
Japan ENCS (JP)	Does not conform	Does not conform	
Japan ISHL (JP)	Does not conform	Does not conform	
Japan IMITI (JP)			listed
Korea KECI (KR)	conforms to	conforms to	listed
Philippines PICCS (PH)	conforms to	conforms to	not listed
Australia AICS	conforms to	conforms to	
New Zealand NZIOC	conforms to	conforms to	listed
Proposition 65			
Chemicals known to cause cancer	not listed	not listed	not listed
Chemicals known to cause reproductive toxicity for females	not listed	not listed	not listed
Chemicals known to cause reproductive toxicity makes	not listed	not listed	not listed
Chemicals known to cause developmental toxicity	not listed	listed	not listed
Carcinogenic categories			
EPA (environmental protection agency)	not listed	not listed	
NIOSH-Ca (national institute for occupational safety and health)	not listed	not listed	
OSHA-Ca	not listed	not listed	
Canadian substance listing			
Canadian domestic substances list (DSL) (limit 0.1%)	not listed		
Canadian domestic substances list (DSL) (limit 1.0%)	not listed		
CERCLA			
Reportable Quantity		5000 lbs	

16. Other Information

HMIS (Hazardous Materials Information System) for secondary labelling:

HMIS	
Health	2
Flammability	1
Reactivity	1

Abbreviations

IOELVs	Indicative Occupational Exposure Limit Values
TWA	Time Weighted Average
OEL	Occupational Exposure Limits
PEL	Permissible Exposure Limit
TLV	Threshold Limit Value
STEL	Short Term Exposure Limit
WEEL	Workplace Environmental Exposure Level by the American Industrial Hygiene Association

REFERENCES:

1. Raw Material Manufacturers Material Safety Data Sheets
2. IARC International Agency for Research on Cancer
3. NTP National Toxicology Program - RoC Report on Carcinogens
4. 2011 Threshold Limit Values and Biological Exposure Indices. American Conference of Governmental Industrial Hygienists.
5. SAX' S Dangerous Properties of Industrial Materials, Tenth Edition
6. TSCA & SARA Title III, U.S. Environmental Protection Agency and the National Technical Information Services
7. US National Institute of Medicines Toxnet current edition
8. ESIS: European Chemical Substance Information System, <http://ecb.jrc.it/esis>
9. NOHSC Hazardous Information Substances Information System, Department of Employment and Workplace Relations,

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