

Safety Data Sheet

according to Regulation (EC) No 1907/2006 and 1272/2008,
Hazard Communication Standard 29 CFR 1910 (USA),
WHS Regulations Australia,
JIS Z 7253 (2012) Japan

Figure 4™ FLEX-BLK 10

Revision Date: August 15, 2019

1. IDENTIFICATION OF THE PREPARATION AND OF THE COMPANY/UNDERTAKING

1.1 Identification of the mixture: Figure 4 FLEX-BLK 10

1.2 Use of the preparation: For use with Figure 4 systems

1.3 Company/undertaking identification:

3D Systems, Inc.
333 Three D Systems Circle
Rock Hill, South Carolina U.S.A.
Phone: 803.326.3900 or
Toll-free Phone: 800.793.3669
e-mail: moreinfo@3dsystems.com
Chemical Emergency:
800.424.9300 – Chemtrec

3D Systems Europe Ltd.
Mark House, Mark Road
Hemel Hempstead
Herts HP2 7 United Kingdom
Phone: +44 144-2282600
e-mail: moreinfo@3dsystems.com
Chemical Emergency:
+1 703.527.3887 - Chemtrec

3D Systems / Australia
5 Lynch Street
Hawthorn, VIC 3122
+1 03 9819-4422
e-mail: moreinfo@3dsystems.com
Chemical Emergency:
+(61) 29037.2994 – Aus Chemtrec

2. HAZARDS IDENTIFICATION

2.1 Classification

GHS : Regulation (EC) No. 1272/2008, 29 CFR 1910, Australian Dangerous Goods Code:

(Corrosion) Damage/irritation - Eye	Category 2A
Aquatic – Chronic	Category 3
Corrosion/irritation - Skin	Category 2
Sensitization - Skin	Category 1
STOT-respiratory irritation - Single exposure	Category 3

2.2 Label Elements

Regulation (EC) No, 1272/2008:

Hazard pictograms and signal word:



GHS07

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
H412 Harmful to aquatic life with long lasting effects

Precautionary statements:

Prevention:

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P264 Wash ... thoroughly after handling.
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.

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Response:

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 CENTRE/doctor/... if you feel unwell.
P321	Specific treatment (see ... on this label).
P332+P313	If skin irritation occurs: Get medical advice/attention.
P333+P313	If skin irritation or rash occurs: Get medical advice/attention.
P337+P313	If eye irritation persists: Get medical advice/attention.
P362	Take off contaminated clothing.
P363	Wash contaminated clothing before reuse.
P391	Collect spillage.

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 INGREDIENTS

CAS #	Approximate % By Weight	Hazardous Statements in accordance with EC 1272/2008
Proprietary 1	25-45	H315,H319,H317
Proprietary 2	10-18	H315,H319,H335,H412

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section

California: "No chemicals listed as Prop 65"

4. FIRST AID MEASURES

4.1 General Information: 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. Ensure that eyewash stations and safety showers are close to the workstation location.

4.2 In case of 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.

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4.3 In case of 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.

4.4 In case of 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

4.5 In case of 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.

4.6 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.

4.7 Self-protection of the first aider: Put on appropriate protective equipment (see section 8). Move exposed person to fresh air. Remove contaminated clothing and shoes.

5. FIRE-FIGHTING MEASURES

5.1 Suitable extinguishing media: Use carbon dioxide or dry chemical for small fires; aqueous foam or water spray for large fires.

5.2 Extinguishing media which must not be used for safety reasons: High volume water jet.

5.3 Special exposure hazards arising from the substance or preparation itself, combustion products, resulting gases: 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. When burned, the following hazardous products of combustion can occur: Carbon oxides, Nitrogen oxides (NOx), hazardous organic compounds

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

5.5 Additional information: Move container from area if it can be done without risk. Cool containers with water spray. Avoid inhalation of material or combustion by-products.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions: Keep unnecessary personnel away. Wear adequate personal protective clothing and equipment, as outlined in Section 8. Consult expert immediately.

6.2 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.

6.3 Methods for 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.

6.4 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.

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7. HANDLING AND STORAGE

7.1 Handling 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

7.2 Storage: 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

7.3 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

8.1 Exposure limit values:

CAS	List Name	List Details	Source
Proprietary 1	Belarus - Occupational Exposure Limits - Harmful Substances - Class 4 - Low Dangerous Substances	Present	LOLI DB
Proprietary 1	Belarus - Occupational Exposure Limits - MACs	20 mg/m3 MAC (vapor)	LOLI DB
Proprietary 1	Germany - DFG - Recommended Exposure Limits - Sensitizers	skin sensitizer	LOLI DB
Proprietary 1	Kazakhstan - Occupational Exposure Limits - Maximum Values (MACs)	20 mg/m3 MAC	LOLI DB
Proprietary 1	Kazakhstan - Occupational Exposure Limits - Noxious Substances - Class 4 - Low Dangerous Substances	Present	LOLI DB
Proprietary 1	Lithuania - Occupational Exposure Limits - Sensitizers	Sensitizer	LOLI DB
Proprietary 1	Lithuania - Occupational Exposure Limits - TWAs (IPRDs)	20 mg/m3 TWA [IPRD]	LOLI DB
Proprietary 1	Norway - Occupational Exposure Limits - Sensitizers	Sensitizing substance	LOLI DB
Proprietary 1	Norway - Occupational Exposure Limits - STELs	4 ppm STEL (value calculated); 16.5 mg/m3 STEL (value calculated)	LOLI DB
Proprietary 1	Norway - Occupational Exposure Limits - TWAs	2 ppm TWA; 11 mg/m3 TWA	LOLI DB
Proprietary 1	Russia - Occupational Exposure Limits - Harmful Substances - Class 4 - Low Dangerous Substances	Present	LOLI DB
Proprietary 1	Russia - Occupational Exposure Limits - MACs	20 mg/m3 MAC (vapor)	LOLI DB

Materials with no data or no limit values are excluded from this table

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8.2 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.

Personal protection equipment:

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).

Hand protection: 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.

Body protection: Use apron and closed shoes.

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

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.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Appearance:

Physical state: liquid

Colour: black

Odour: characteristic acrylate

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9.2 Important health, safety and environmental information

Specific Gravity	1.09 – 1.22
Boiling point/range (°C):	>100
VOC (g/l):	Theoretically very close to zero at normal ambient conditions
Flash point (°C):	> 93 °C / 200 °F (Setaflash)
Ignition temperature (°C):	No data
Vapour pressure (°C):	unknown
Water solubility:	Only very slightly soluble
Solubility in organic solvents	Soluble or swellable in many organic solvents
Viscosity, dynamic (cps @ 25C):	2000
Volatile Characteristics	Negligible in normal conditions (increased temperature will increase volatility)
Lower explosion limit:	No data
Upper explosion limit	No data
Electrostatic Discharge	Safe
Electric Conductivity	Dialectric

10. STABILITY AND REACTIVITY

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

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

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

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

10.5 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

CAS	List Name	List Details	Source
Proprietary 1	Toxicology Data - Selected Dermal LD50s	Dermal LD50 Rabbit >3000 mg/kg (Source: IUCLID)	LOLI DB
Proprietary 1	Toxicology Data - Selected LD50s and LC50s	Dermal LD50 Rabbit >3000 mg/kg (Source: IUCLID); Oral LD50 Rat 5050 mg/kg (Source: NLM_CIP)	LOLI DB
Proprietary 1	Toxicology Data - Selected Oral LD50s	Oral LD50 Rat 5050 mg/kg (Source: NLM_CIP)	LOLI DB

Materials with no data or no toxicology data are excluded from this table

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.

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13. DISPOSAL CONSIDERATIONS

13.1 General: Avoid release into the environment. As with all foreign substances, do not allow to enter storm or sewer drainage systems. Dispose of in accordance with governmental regulations (community, national or regional).

13.2 Additional information: Prior to disposal, 3D Systems recommends consulting an approved waste disposal firm to ensure regulatory compliance.

14. TRANSPORT INFORMATION

DOT	Not Regulated
IATA	Not Regulated
IMDG	Not Regulated
ADR/RID	Not Regulated

15. REGULATORY INFORMATION

The following provides a summary of the legal requirements.

Complies	TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
Complies	AICS - Australian Inventory of Chemical Substances
Complies	DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
Complies	EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
Complies	ENCS - Japan Existing and New Chemical Substances
Complies	IECSC - China Inventory of Existing Chemical Substances
Complies	KECL - Korean Existing and Evaluated Chemical Substances
Complies	NZIoC - New Zealand Inventory of Chemicals
Complies	PICCS - Philippines Inventory of Chemicals and Chemical Substances
Complies	ECSI - Taiwan Existing Substance Inventory
All Items are Registered	EU – REACH -
No Items Listed	CERCLA/SARA – Section 302
No Items Listed	CERCLA/SARA – Section 303

16. OTHER INFORMATION

Abbreviations

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

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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

16.2 Further information:

SDS Creation Date: July 19, 2018

SDS Revision #: -00-C

SDS Revision Date: August 15, 2019

Reason for Revision: Update section 1

www.3dsystems.com

800.793.3669 (Toll-free in the US GMT-07:00; N. America, Mon – Fri, 6:00 a.m. to 6 p.m.)

803.326.3900 (Outside the U.S. GMT-07:00; N. America, Mon – Fri, 6:00 a.m. to 6 p.m.)

+44 144-2282600 (Europe GMT+01:00; Mon – Fri, 08:00 a.m. - 17:00 p.m. MEZ)

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