Safety Data Sheet

according to the Hazard Communication Standard (CFR29 1910.1200) HazCom 2012

Date of issue: 08/29/2025 Version: 4.0 Reviewed on 08/29/2025

1 Identification

Product identifier

Product name: IRF6 UV-LED Ink, White

Other means of identification

Article number: I-6104

Application of the substance / the mixture: Printing inks

Details of the supplier of the safety data sheet

Direct Color Systems
99 Hammer Mill Rd.
Rocky Hill, CT 06067-USA

Manufacturer/Supplier:

Direct Color Systems
99 Hammer Mill Rd.
Rocky Hill, CT 06067-USA

Emergency telephone number US: 24/7 CHEMTREC 1-800-424-9300

Emergency telephone number International: 24/7 CHEMTREC +1 703-527-3887

* 2 Hazard(s) identification

Classification of the substance or mixture

Skin corrosion 1C	H314	Causes severe skin burns and eye damage.
Eye damage 1	H318	Causes serious eye damage.
Sensitization - skin 1	H317	May cause an allergic skin reaction.
Reproductive toxicity 1B	H360	May damage fertility or the unborn child.
Specific target organ toxicity (single exposure) 3	H335-H336	May cause respiratory irritation. May cause drowsiness or dizziness.
Specific target organ toxicity (repeated exposure) 1	H372	Causes damage to organs through prolonged or repeated exposure.

Label elements

GHS label elements The product is classified and labeled according to the Globally Harmonized System (GHS).

Hazard pictograms

GHS05 GHS07 GHS08

Signal word Danger

Hazard-determining components of labeling:
Tetrahydrofurfuryl Acrylate
3,3,5-Trimethylcyclohexyl acrylate
2H-Azepin-2-one, 1-ethenylhexahydro-
diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
Isobournyl Acrylate

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Dipropylene glycol diacrylate
propylidynetrimethanol, ethoxylated, esters with acrylic acid
Amine Acrylate

Hazard statements
Causes severe skin burns and eye damage.
May cause an allergic skin reaction.
May damage fertility or the unborn child.
May cause respiratory irritation. May cause drowsiness or dizziness.
Causes damage to organs through prolonged or repeated exposure.

Precautionary statements
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not breathe dusts or mists.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Contaminated work clothing must not be allowed out of the workplace.
Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.
If swallowed: Rinse mouth. Do NOT induce vomiting.
If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
If inhaled: Remove person to fresh air and keep comfortable for breathing.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Immediately call a poison center/doctor.
IF exposed or concerned: Get medical advice/attention.
Specific treatment (see on this label).
Get medical advice/attention if you feel unwell.
Take off contaminated clothing and wash it before reuse.
If skin irritation or rash occurs: Get medical advice/attention.
Wash contaminated clothing before reuse.
Store in a well-ventilated place. Keep container tightly closed.
Store locked up.
Dispose of contents/container in accordance with local/regional/national/international regulations.

Classification according to (d)(1)(ii) of § 1910.1200
The SDS issuer does not object to the classifications provided by importers or manufacturers of precursor products.

Hazards not otherwise classified
There are no adverse physical or health effects known that are not covered by the hazard classes of the Hazard Communications Standard.

* 3 Composition/information on ingredients

Chemical characterization: Mixtures
Description: Mixture of the substances listed below with nonhazardous additions.

Dangerous components:

86178-38-3	3,3,5-Trimethylcyclohexyl acrylate Skin irritation 2, H315; Eye irritation 2A, H319; Sensitization - skin 1B, H317; Specific target organ toxicity (single exposure) 3, H336	25 - 50%
2399-48-6	Tetrahydrofurfuryl Acrylate Reproductive toxicity 1B, H360; Skin corrosion 1C, H314; Eye damage 1, H318; Acute toxicity - oral 4, H302; Sensitization - skin 1, H317; Flammable liquids 4, H227	25 - 50%
5888-33-5	Isobournyl Acrylate Skin irritation 2, H315; Eye irritation 2A, H319; Sensitization - skin 1, H317; Specific target organ toxicity (single exposure) 3, H335	10 - 25%

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13463-67-7	titanium dioxide Carcinogenicity 2, H351	≥ 2.5 - ≤ 10%
75980-60-8	diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide Reproductive toxicity 1B, H360; Sensitization - skin 1B, H317	2.5 - 10%
57472-68-1	Dipropylene glycol diacrylate Eye damage 1, H318; Skin irritation 2, H315; Sensitization - skin 1, H317	≥ 0 - ≤ 10%
28961-43-5	propylidynetrimethanol, ethoxylated, esters with acrylic acid Eye irritation 2A, H319; Sensitization - skin 1, H317	≤ 2.5%
2235-00-9	2H-Azepin-2-one, 1-ethenylhexahydro- Specific target organ toxicity (repeated exposure) 1, H372; Acute toxicity - oral 4, H302; Acute toxicity - dermal 4, H312; Eye irritation 2A, H319; Sensitization - skin 1, H317	≤ 2.5%
	Amine Acrylate Skin irritation 2, H315; Sensitization - skin 1, H317; Specific target organ toxicity (single exposure) 3, H336; Eye irritation 2B, H320	≤ 2.5%

Additional information:

The specific chemical identity of composition and exact percentage is being withheld as a trade secret. The specific chemical identity and exact percentage is made available to health professionals, employees, and designated representatives in accordance with the applicable provisions of paragraph §1910.1200.

4 First-aid measures

Description of first aid measures

General information:

Immediately remove any clothing soiled by the product.

Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.

After inhalation:

Supply fresh air and to be sure call for a doctor.

In case of unconsciousness place patient stably in side position for transportation.

After skin contact: Immediately wash with water and soap and rinse thoroughly.

After eye contact: Rinse opened eye for several minutes under running water. Then consult a doctor.

After swallowing:

Immediately call a doctor.

Drink copious amounts of water and provide fresh air. Immediately call a doctor.

Most important symptoms and effects, both acute and delayed No further relevant information available.

Indication of any immediate medical attention and special treatment needed

No further relevant information available.

5 Fire-fighting measures

Extinguishing media

Suitable extinguishing agents: Use fire fighting measures that suit the environment.

Special hazards arising from the substance or mixture No further relevant information available.

Advice for firefighters

Protective equipment: No special measures required.

6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

Wear protective equipment. Keep unprotected persons away.

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Product name: IRF6 UV-LED Ink, White

Environmental precautions:
Do not allow product to reach sewage system or any water course.
Inform respective authorities in case of seepage into water course or sewage system.
Dilute with plenty of water.
Do not allow to enter sewers/ surface or ground water.
Methods and material for containment and cleaning up:
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Use neutralizing agent.
Dispose contaminated material as waste according to section 13.
Ensure adequate ventilation.
Reference to other sections
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

Precautions for safe handling
Ensure good ventilation/exhaustion at the workplace.
Open and handle receptacle with care.
Prevent formation of aerosols.
Information about protection against explosions and fires: Keep respiratory protective device available.

Conditions for safe storage, including any incompatibilities
Storage:
Requirements to be met by storerooms and receptacles: No special requirements.
Information about storage in one common storage facility: Not required.
Further information about storage conditions: Keep receptacle tightly sealed.
Specific end use(s) No further relevant information available.

8 Exposure controls/personal protection

Control parameters
Components with limit values that require monitoring at the workplace:
The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.
Additional information: The lists that were valid during the creation were used as basis.

Exposure controls
Appropriate engineering controls No further data; see section 7.
Personal protective equipment:
General protective and hygienic measures:
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Store protective clothing separately.
Avoid contact with the eyes and skin.
Breathing equipment:
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use respiratory protective device that is independent of circulating air.

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Protection of hands:

Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

Material of gloves

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

Penetration time of glove material

The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

Eye protection:

Tightly sealed goggles

* 9 Physical and chemical properties

Information on basic physical and chemical properties

General Information

Physical state	Liquid
Color:	White
Odor:	Characteristic
Odor threshold:	Not determined.
Melting point/Melting range:	Undetermined.
Boiling point/Boiling range:	Undetermined.
Flammability:	Not applicable.
Explosion limits:	
Lower:	Not determined.
Upper:	Not determined.
Flash point:	Not applicable.
Decomposition temperature:	Not determined.
pH-value:	Not determined.
Viscosity:	
Kinematic:	Not determined.
Dynamic:	Not determined.
Solubility in / Miscibility with	
Water:	Fully miscible.
Partition coefficient (n-octanol/water):	Not determined.
Vapor pressure:	Not determined.
Vapor pressure:	
Density:	Not determined.
Relative density	Not determined.
Vapor density	Not determined.
Particle characteristics	Not applicable.

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Product name: IRF6 UV-LED Ink, White

Other information
Appearance:
Form: Liquid
Important information on protection of health and environment, and on safety.
Ignition temperature: Product is not selfigniting.
Danger of explosion: Product does not present an explosion hazard.
Change in condition
Evaporation rate Not determined.

10 Stability and reactivity

Reactivity No further relevant information available.
Chemical stability
Thermal decomposition / conditions to be avoided: No decomposition if used according to specifications.
Possibility of hazardous reactions No dangerous reactions known.
Conditions to avoid No further relevant information available.
Incompatible materials: No further relevant information available.
Hazardous decomposition products: No dangerous decomposition products known.

* 11 Toxicological information

Information on toxicological effects
Acute toxicity:
LD/LC50 values that are relevant for classification:

ATE (Acute Toxicity Estimate)

Oral	LD50	3,220 mg/kg
Dermal	LD50	56,689 mg/kg

2399-48-6 Tetrahydrofurfuryl Acrylate

Oral	LD50	928 mg/kg (rat)

13463-67-7 titanium dioxide

Oral	LD50	> 20,000 mg/kg (rat)
Dermal	LD50	> 10,000 mg/kg (rabbit)
Inhalative	LC50/4 h	> 6.82 mg/l (rat)

2235-00-9 2H-Azepin-2-one, 1-ethenylhexahydro-

Oral	LD50	500 mg/kg (ATE)
Dermal	LD50	1,100 mg/kg (ATE)

Primary irritant effect:
on the skin: Strong caustic effect on skin and mucous membranes.
on the eye: Strong caustic effect.
Sensitization: Sensitization possible through skin contact.
Additional toxicological information:
The product shows the following dangers according to internally approved calculation methods for preparations:
Harmful
Corrosive
Irritant
Swallowing will lead to a strong caustic effect on mouth and throat and to the danger of perforation of esophagus and stomach.
Interactive effects No interactive effects between components are known.

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Product name: IRF6 UV-LED Ink, White

Carcinogenic categories

IARC (International Agency for Research on Cancer)

13463-67-7 titanium dioxide: 2B

105-60-2 1,6-hexanolactam: 3

108-88-3 Toluene: 3

NTP (National Toxicology Program)

None of the ingredients is listed.

OSHA-Ca (Occupational Safety & Health Administration)

None of the ingredients is listed.

Alternative sources for toxicological information

No non-standard sources for toxicological information where used.

12 Ecological information

Toxicity

Aquatic toxicity: No further relevant information available.

Persistence and degradability No further relevant information available.

Bioaccumulative potential No further relevant information available.

Mobility in soil No further relevant information available.

Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

Other adverse effects

Remark: Very toxic for fish

Additional ecological information:

General notes:

Water hazard class 3 (Self-assessment): extremely hazardous for water

Do not allow product to reach ground water, water course or sewage system, even in small quantities.

Must not reach bodies of water or drainage ditch undiluted or unneutralized.

Danger to drinking water if even extremely small quantities leak into the ground.

Also poisonous for fish and plankton in water bodies.

Very toxic for aquatic organisms

13 Disposal considerations

Waste treatment methods

Recommendation:

Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

Uncleaned packagings:

Recommendation: Disposal must be made according to official regulations.

Recommended cleansing agent: Water, if necessary with cleansing agents.

14 Transport information

UN-Number

DOT	not regulated
IMDG, IATA	UN3082

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Product name: IRF6 UV-LED Ink, White

UN proper shipping name

DOT not regulated

IMDG ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (3,3,5-Trimethylcyclohexyl acrylate, Tetrahydrofurfuryl Acrylate), MARINE POLLUTANT

IATA ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (3,3,5-Trimethylcyclohexyl acrylate, Tetrahydrofurfuryl Acrylate)

Transport hazard class(es)

DOT

Class not regulated

IMDG, IATA

Class 9 Miscellaneous dangerous substances and articles

Label 9

Packing group

DOT not regulated

IMDG, IATA III

Environmental hazards:

Marine pollutant: Symbol (fish and tree)

Special marking (IATA): Symbol (fish and tree)

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code Not applicable.

Transport/Additional information:

IMDG

Limited quantities (LQ) 5L

Excepted quantities (EQ) Code: E1
Maximum net quantity per inner packaging: 30 ml
Maximum net quantity per outer packaging: 1000 ml

Special precautions for user Warning: Miscellaneous dangerous substances and articles

Hazard identification number (Kemler code): 90

EMS Number: F-A,S-F

Stowage Category A

UN "Model Regulation": UN 3082 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (3,3,5-TRIMETHYLCYCLOHEXYL ACRYLATE, TETRAHYDROFURFURYL ACRYLATE), 9, III

* 15 Regulatory information

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

SARA

Section 355 (extremely hazardous substances):

None of the ingredients is listed.

Section 313 (Specific toxic chemical listings):

None of the ingredients is listed.

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TSCA (Toxic Substances Control Act):
All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory.

86178-38-3 3,3,5-Trimethylcyclohexyl acrylate: ACTIVE

5888-33-5 Isobournyl Acrylate: ACTIVE

13463-67-7 titanium dioxide: ACTIVE

75980-60-8 diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide: ACTIVE

57472-68-1 Dipropylene glycol diacrylate: ACTIVE

28961-43-5 propylidynetrimethanol, ethoxylated, esters with acrylic acid: ACTIVE

2235-00-9 2H-Azepin-2-one, 1-ethenylhexahydro-: ACTIVE

Hazardous Air Pollutants

108-88-3 Toluene

Proposition 65

Chemicals known to cause cancer:

13463-67-7 titanium dioxide

Chemicals known to cause reproductive toxicity for females:

None of the ingredients is listed.

Chemicals known to cause reproductive toxicity for males:

None of the ingredients is listed.

Chemicals known to cause developmental toxicity:

108-88-3 Toluene

Carcinogenic categories

EPA (Environmental Protection Agency)

110-82-7 cyclohexane: I

108-88-3 Toluene: II

TLV (Threshold Limit Value)

13463-67-7 titanium dioxide: A4

105-60-2 1,6-hexanolactam: A5

108-88-3 Toluene: A4

NIOSH-Ca (National Institute for Occupational Safety and Health)

13463-67-7 titanium dioxide

GHS label elements The product is classified and labeled according to the Globally Harmonized System (GHS).

Hazard pictograms

GHS05 GHS07 GHS08

Signal word Danger

Hazard-determining components of labeling:
Tetrahydrofurfuryl Acrylate
3,3,5-Trimethylcyclohexyl acrylate
2H-Azepin-2-one, 1-ethenylhexahydro-
diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
Isobournyl Acrylate
Dipropylene glycol diacrylate
propylidynetrimethanol, ethoxylated, esters with acrylic acid
Amine Acrylate

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Product name: IRF6 UV-LED Ink, White

Hazard statements
Causes severe skin burns and eye damage.
May cause an allergic skin reaction.
May damage fertility or the unborn child.
May cause respiratory irritation. May cause drowsiness or dizziness.
Causes damage to organs through prolonged or repeated exposure.
Precautionary statements
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not breathe dusts or mists.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Contaminated work clothing must not be allowed out of the workplace.
Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.
If swallowed: Rinse mouth. Do NOT induce vomiting.
If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
If inhaled: Remove person to fresh air and keep comfortable for breathing.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Immediately call a poison center/doctor.
IF exposed or concerned: Get medical advice/attention.
Specific treatment (see on this label).
Get medical advice/attention if you feel unwell.
Take off contaminated clothing and wash it before reuse.
If skin irritation or rash occurs: Get medical advice/attention.
Wash contaminated clothing before reuse.
Store in a well-ventilated place. Keep container tightly closed.
Store locked up.
Dispose of contents/container in accordance with local/regional/national/international regulations.
Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Relevant phrases
H227 Combustible liquid.
H302 Harmful if swallowed.
H312 Harmful in contact with skin.
H314 Causes severe skin burns and eye damage.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage.
H319 Causes serious eye irritation.
H320 Causes eye irritation.
H335 May cause respiratory irritation.
H336 May cause drowsiness or dizziness.
H351 Suspected of causing cancer.
H360 May damage fertility or the unborn child.
H372 Causes damage to organs through prolonged or repeated exposure.
Date of previous version 09/27/2023
Version number of previous version: 2.0

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Date of preparation 08/29/2025

Abbreviations and acronyms:

IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
Flammable liquids 4: Flammable liquids – Category 4
Acute toxicity - oral 4: Acute toxicity – Category 4
Skin corrosion 1C: Skin corrosion/irritation – Category 1C
Skin irritation 2: Skin corrosion/irritation – Category 2
Eye damage 1: Serious eye damage/eye irritation – Category 1
Eye irritation 2A: Serious eye damage/eye irritation – Category 2A
Eye irritation 2B: Serious eye damage/eye irritation – Category 2B
Sensitization - skin 1: Skin sensitisation – Category 1
Sensitization - skin 1B: Skin sensitisation – Category 1B
Carcinogenicity 2: Carcinogenicity – Category 2
Reproductive toxicity 1B: Reproductive toxicity – Category 1B
Specific target organ toxicity (single exposure) 3: Specific target organ toxicity (single exposure) – Category 3
Specific target organ toxicity (repeated exposure) 1: Specific target organ toxicity (repeated exposure) – Category 1

*** Data compared to the previous version altered.**