

**Safety Data Sheet**

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

Printing date 08/19/2021

Version: 1.1

Reviewed on 08/19/2021

**\* 1 Identification****Product identifier****Product name: IRF4 UV-LED Ink, Black****Article number: I-4102****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**

Flam. Liq. 4 H227 Combustible liquid.

Acute Tox. 4 H302 Harmful if swallowed.

Skin Corr. 1C H314 Causes severe skin burns and eye damage.

Eye Dam. 1 H318 Causes serious eye damage.

Skin Sens. 1 H317 May cause an allergic skin reaction.

Repr. 1B H360 May damage fertility or the unborn child.

STOT SE 3 H335 May cause respiratory irritation.

STOT RE 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

Isobornyl Acrylate

2H-Azepin-2-one, 1-ethenylhexahydro-

Diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide

2-Propenoic acid, 2-[2-(ethenylloxy)ethoxy]ethyl ester

phenyl bis(2,4,6-trimethylbenzoyl)-phosphine oxide

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**Product name: IRF4 UV-LED Ink, Black****Hazard statements**

Combustible liquid.  
 Harmful if swallowed.  
 Causes severe skin burns and eye damage.  
 May cause an allergic skin reaction.  
 May damage fertility or the unborn child.  
 May cause respiratory irritation.  
 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.  
 Keep away from flames and hot surfaces. – No smoking.  
 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.  
 If swallowed: Call a poison center/doctor if you feel unwell.  
 If swallowed: Rinse mouth. Do NOT induce vomiting.  
 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/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.  
 If skin irritation or rash occurs: Get medical advice/attention.  
 Wash contaminated clothing before reuse.  
 In case of fire: Use CO<sub>2</sub>, powder or water spray to extinguish.  
 Store in a well-ventilated place. Keep container tightly closed.  
 Store in a well-ventilated place. Keep cool.  
 Store locked up.  
 Dispose of contents/container in accordance with local/regional/national/international regulations.

**3 Composition/information on ingredients****Chemical characterization: Mixtures****Description:** Mixture of the substances listed below with nonhazardous additions.**Dangerous components:**

2399-48-6 Tetrahydrofurfuryl Acrylate	25 - 50%
Repr. 1B, H360; Skin Corr. 1C, H314; Eye Dam. 1, H318; Acute Tox. 4, H302; Skin Sens. 1, H317; Flam. Liq. 4, H227	
5888-33-5 Isobournyl Acrylate	25 - 50%
Skin Irrit. 2, H315; Eye Irrit. 2A, H319; Skin Sens. 1, H317; STOT SE 3, H335	
75980-60-8 Diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide	2.5 - 10%
Repr. 2, H361	
2235-00-9 2H-Azepin-2-one, 1-ethenylhexahydro-	2.5 - 10%
STOT RE 1, H372; Acute Tox. 4, H302; Acute Tox. 4, H312; Eye Irrit. 2A, H319; Skin Sens. 1, H317	

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1333-86-4 Carbon black	≥ 0 - ≤ 2.5%
Self-heat. 2, H252; Carc. 2, H351	
86273-46-3 2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester	≥ 0 - ≤ 2.5%
Acute Tox. 4, H302; Skin Sens. 1, H317	
162881-26-7 phenyl bis(2,4,6-trimethylbenzoyl)-phosphine oxide	≤ 2.5%
Skin Sens. 1, H317	

## 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:

CO<sub>2</sub>, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

**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.

### 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 item 13.

Ensure adequate ventilation.

### Reference to other sections

See Section 7 for information on safe handling.

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See Section 8 for information on personal protection equipment.  
See Section 13 for disposal information.

## 7 Handling and storage

### Handling:

#### 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

**Additional information about design of technical systems:** No further data; see item 7.

### Control parameters

#### Components with limit values that require monitoring at the workplace:

The following constituent is the only constituent of the product which has a PEL, TLV or other recommended exposure limit.

At this time, the other constituents have no known exposure limits.

#### 1333-86-4 Carbon black

PEL Long-term value: 3.5 mg/m<sup>3</sup>

REL Long-term value: 3.5\* mg/m<sup>3</sup>

\*0.1 in presence of PAHs; See Pocket Guide Apps.A+C

TLV Long-term value: 3\* mg/m<sup>3</sup>

\*inhalable fraction

**Additional information:** The lists that were valid during the creation were used as basis.

### Exposure controls

#### 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.

##### Protection of hands:



Protective gloves

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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

#### Appearance:

<b>Form:</b>	Liquid
<b>Color:</b>	Black
<b>Odor:</b>	Characteristic
<b>Odor threshold:</b>	Not determined.

**pH-value:** Not determined.

#### Change in condition

<b>Melting point/Melting range:</b>	Undetermined.
<b>Boiling point/Boiling range:</b>	Undetermined.

**Flash point:** 93 °C (199.4 °F)

**Flammability (solid, gaseous):** Not applicable.

**Decomposition temperature:** Not determined.

**Auto igniting:** Product is not selfigniting.

**Danger of explosion:** Not determined.

#### Explosion limits:

<b>Lower:</b>	Not determined.
<b>Upper:</b>	Not determined.

**Vapor pressure:** Not determined.

<b>Density:</b>	Not determined.
<b>Relative density</b>	Not determined.
<b>Vapor density</b>	Not determined.
<b>Evaporation rate</b>	Not determined.

#### Solubility in / Miscibility with

**Water:** Fully miscible.

**Partition coefficient (n-octanol/water):** Not determined.

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**Product name: IRF4 UV LED Ink, Black**

**Viscosity:**

**Dynamic:** Not determined.

**Kinematic:** Not determined.

**Other information** No further relevant information available.

## 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 241 mg/kg

Dermal LD50 22,449 mg/kg

**2399-48-6 Tetrahydrofurfuryl Acrylate**

Oral LD50 928 mg/kg (rat)

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

Oral LD50 500 mg/kg (ATE)

Dermal LD50 1,100 mg/kg (ATE)

**1333-86-4 Carbon black**

Oral LD50 10,000 mg/kg (rat)

**86273-46-3 2-Propenoic acid, 2-[2-(ethenylloxy)ethoxy]ethyl ester**

Oral LD50 500 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.

**Carcinogenic categories**

**IARC (International Agency for Research on Cancer)**

1333-86-4 Carbon black: 2B

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

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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.

**Reproductive toxicity**

**2399-48-6 Tetrahydrofurfuryl Acrylate**

Oral NOAEL 120 mg/kg/day (rat)

## 12 Ecological information

**Toxicity**

**Aquatic toxicity:** No further relevant information available.

**Persistence and degradability** No further relevant information available.

**Behavior in environmental systems:**

**Bioaccumulative potential** No further relevant information available.

**Mobility in soil** No further relevant information available.

**Ecotoxicological effects:**

**Remark:** Toxic for fish

**Additional ecological information:**

**General notes:**

Water hazard class 2 (Self-assessment): hazardous for water

Do not allow product to reach ground water, water course or sewage system.

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

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

Also poisonous for fish and plankton in water bodies.

Toxic for aquatic organisms

**Results of PBT and vPvB assessment**

**PBT:** Not applicable.

**vPvB:** Not applicable.

**Other adverse effects** No further relevant information available.

## 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

**UN proper shipping name**

**DOT** not regulated

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<b>IMDG</b>	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Tetrahydrofurfuryl Acrylate), MARINE POLLUTANT
<b>IATA</b>	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Tetrahydrofurfuryl Acrylate)
<b>Transport hazard class(es)</b>	
<b>DOT</b>	
<b>Class</b>	not regulated
<b>IMDG, IATA</b>	
<b>O</b>	
<b>Class</b>	9 Miscellaneous dangerous substances and articles
<b>Label</b>	9
<b>Packing group</b>	
<b>DOT</b>	not regulated
<b>IMDG, IATA</b>	III
<b>Environmental hazards:</b>	
<b>Marine pollutant:</b>	Symbol (fish and tree)
<b>Special marking (IATA):</b>	Symbol (fish and tree)
<b>Special precautions for user</b>	Warning: Miscellaneous dangerous substances and articles
<b>Hazard identification number (Kemler code):</b>	90
<b>EMS Number:</b>	F-A,S-F
<b>Stowage Category</b>	A
<b>Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code</b>	Not applicable.
<b>Transport/Additional information:</b>	
<b>IMDG</b>	
<b>Limited quantities (LQ)</b>	5L
<b>Excepted quantities (EQ)</b>	Code: E1 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 1000 ml
<b>UN "Model Regulation":</b>	UN 3082 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (TETRAHYDROFURFURYL ACRYLATE), 9, III

## \*15 Regulatory information

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

No further relevant information available.

#### SARA

##### **Section 355 (extremely hazardous substances):**

None of the ingredients is listed.

##### **Section 313 (Specific toxic chemical listings):**

None of the ingredients is listed.

##### **TSCA (Toxic Substances Control Act):**

5888-33-5 Isobournyl Acrylate: ACTIVE

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

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

1333-86-4 Carbon black: ACTIVE

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86273-46-3 2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester: ACTIVE

162881-26-7 phenyl bis(2,4,6-trimethylbenzoyl)-phosphine oxide: ACTIVE

### Hazardous Air Pollutants

108-88-3 Toluene

#### **Proposition 65**

#### **Chemicals known to cause cancer:**

1333-86-4 Carbon black

#### **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)**

1333-86-4 Carbon black: A4

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

108-88-3 Toluene: A4

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

1333-86-4 Carbon black

**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

Isobournyl Acrylate

2H-Azepin-2-one, 1-ethenylhexahydro-

Diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester

phenyl bis(2,4,6-trimethylbenzoyl)-phosphine oxide

#### **Hazard statements**

Combustible liquid.

Harmful if swallowed.

Causes severe skin burns and eye damage.

May cause an allergic skin reaction.

May damage fertility or the unborn child.

May cause respiratory irritation.

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.

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 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.  
 If swallowed: Call a poison center/doctor if you feel unwell.  
 If swallowed: Rinse mouth. Do NOT induce vomiting.  
 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/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.  
 If skin irritation or rash occurs: Get medical advice/attention.  
 Wash contaminated clothing before reuse.  
 In case of fire: Use CO<sub>2</sub>, powder or water spray to extinguish.  
 Store in a well-ventilated place. Keep container tightly closed.  
 Store in a well-ventilated place. Keep cool.  
 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.

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## 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.  
 H252 Self-heating in large quantities; may catch fire.  
 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.  
 H335 May cause respiratory irritation.  
 H351 Suspected of causing cancer.  
 H360 May damage fertility or the unborn child.  
 H361 Suspected of damaging fertility or the unborn child.  
 H372 Causes damage to organs through prolonged or repeated exposure.

### Contact:

#### 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

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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  
Flam. Liq. 4: Flammable liquids – Category 4  
Self-heat. 2: Self-heating substances and mixtures – Category 2  
Acute Tox. 4: Acute toxicity – Category 4  
Skin Corr. 1C: Skin corrosion/irritation – Category 1C  
Skin Irrit. 2: Skin corrosion/irritation – Category 2  
Eye Dam. 1: Serious eye damage/eye irritation – Category 1  
Eye Irrit. 2A: Serious eye damage/eye irritation – Category 2A  
Skin Sens. 1: Skin sensitisation – Category 1  
Carc. 2: Carcinogenicity – Category 2  
Repr. 1B: Reproductive toxicity – Category 1B  
Repr. 2: Reproductive toxicity – Category 2  
STOT SE 3: Specific target organ toxicity (single exposure) – Category 3  
STOT RE 1: Specific target organ toxicity (repeated exposure) – Category 1

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

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