

# SAFETY DATA SHEET



Multiple Heart-Cutting Starter Kit, Part Number G4242-68000

## Section 1. Identification

**Product identifier** : Multiple Heart-Cutting Starter Kit, Part Number G4242-68000  
**Part no. (chemical kit)** : G4242-68000  
**Part no.** : Formic Acid G2453-85060  
 2D-LC Solution 5190-6895

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

**Identified uses** : Reagents and Standards for Analytical Chemistry Laboratory Use  
 Formic Acid 5 mL  
 2D-LC Solution 1 x 2 mL

**Supplier/Manufacturer** : Agilent Technologies Australia Pty Ltd  
 679 Springvale Road  
 Mulgrave  
 Victoria 3170, Australia  
 1800 802 402

**Emergency telephone number (with hours of operation)** : CHEMTREC®: +(61)-290372994

## Section 2. Hazard(s) identification

### Classification of the substance or mixture

#### Formic Acid



H226 FLAMMABLE LIQUIDS - Category 3  
 H302 ACUTE TOXICITY (oral) - Category 4  
 H331 ACUTE TOXICITY (inhalation) - Category 3  
 H314 SKIN CORROSION/IRRITATION - Category 1  
 H319 SERIOUS EYE DAMAGE/EYE IRRITATION - Category 2A  
 H335 SPECIFIC TARGET ORGAN TOXICITY - SINGLE EXPOSURE (Respiratory tract irritation) - Category 3

#### 2D-LC Solution

H225 FLAMMABLE LIQUIDS - Category 2  
 H302 ACUTE TOXICITY (oral) - Category 4  
 H312 ACUTE TOXICITY (dermal) - Category 4  
 H332 ACUTE TOXICITY (inhalation) - Category 4  
 H319 SERIOUS EYE DAMAGE/EYE IRRITATION - Category 2A  
 H336 SPECIFIC TARGET ORGAN TOXICITY - SINGLE EXPOSURE (Narcotic effects) - Category 3  
 H400 SHORT-TERM (ACUTE) AQUATIC HAZARD - Category 1  
 H410 LONG-TERM (CHRONIC) AQUATIC HAZARD - Category 1

### GHS label elements

## Section 2. Hazard(s) identification

<b>Hazard pictograms</b>	: Formic Acid	
	2D-LC Solution	
<b>Signal word</b>	: Formic Acid 2D-LC Solution	DANGER DANGER
<b>Hazard statements</b>	: Formic Acid	H226 - Flammable liquid and vapour. H302 - Harmful if swallowed. H314 - Causes severe skin burns and eye damage. H331 - Toxic if inhaled.
	2D-LC Solution	H335 - May cause respiratory irritation. H225 - Highly flammable liquid and vapour. H302 + H312 + H332 - Harmful if swallowed, in contact with skin or if inhaled. H319 - Causes serious eye irritation. H336 - May cause drowsiness or dizziness. H410 - Very toxic to aquatic life with long lasting effects.
<b><u>Precautionary statements</u></b>		
<b>Prevention</b>	: Formic Acid	P280 - Wear protective gloves, protective clothing and eye or face protection. P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
	2D-LC Solution	P280 - Wear protective gloves and protective clothing. Wear eye or face protection. P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P273 - Avoid release to the environment.
<b>Response</b>	: Formic Acid	P304 + P310 - IF INHALED: Immediately call a POISON CENTER or doctor. P301 + P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor.
	2D-LC Solution	P391 - Collect spillage.
<b>Storage</b>	: Formic Acid	P403 + P233 - Store in a well-ventilated place. Keep container tightly closed.
	2D-LC Solution	P403 + P233 - Store in a well-ventilated place. Keep container tightly closed.
<b>Disposal</b>	: Formic Acid	P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
	2D-LC Solution	P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
<b>Supplemental label elements</b>		
<b>Additional warning phrases</b>	: Formic Acid 2D-LC Solution	Not applicable. Not applicable.
<b>Other hazards which do not result in classification</b>	: Formic Acid 2D-LC Solution	Causes severe digestive tract burns. None known.



## Section 4. First aid measures

### Skin contact

: Formic Acid

2D-LC Solution

### Ingestion

: Formic Acid

2D-LC Solution

apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Get medical attention immediately. Call a poison center or physician. Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. Wash clothing before reuse. Clean shoes thoroughly before reuse. Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention if adverse health effects persist or are severe. If necessary, call a poison center or physician. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. Wash out mouth with water. Remove dentures if any. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. If necessary, call a poison center or physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

### Most important symptoms/effects, acute and delayed

### Potential acute health effects

## Section 4. First aid measures

<b>Eye contact</b>	: Formic Acid 2D-LC Solution	Causes serious eye irritation. Causes serious eye irritation.
<b>Inhalation</b>	: Formic Acid 2D-LC Solution	Toxic if inhaled. May cause respiratory irritation. Harmful if inhaled. Can cause central nervous system (CNS) depression. May cause drowsiness or dizziness.
<b>Skin contact</b>	: Formic Acid 2D-LC Solution	Causes severe burns. Harmful in contact with skin.
<b>Ingestion</b>	: Formic Acid  2D-LC Solution	Severely corrosive to the digestive tract. Causes severe burns. Harmful if swallowed. Harmful if swallowed. Can cause central nervous system (CNS) depression.

### Over-exposure signs/symptoms

<b>Eye contact</b>	: Formic Acid  2D-LC Solution	Adverse symptoms may include the following: pain watering redness Adverse symptoms may include the following: pain or irritation watering redness
<b>Inhalation</b>	: Formic Acid  2D-LC Solution	Adverse symptoms may include the following: respiratory tract irritation coughing Adverse symptoms may include the following: nausea or vomiting headache drowsiness/fatigue dizziness/vertigo unconsciousness
<b>Skin contact</b>	: Formic Acid  2D-LC Solution	Adverse symptoms may include the following: pain or irritation redness blistering may occur No specific data.
<b>Ingestion</b>	: Formic Acid  2D-LC Solution	Adverse symptoms may include the following: stomach pains No specific data.

### Indication of immediate medical attention and special treatment needed, if necessary

<b>Notes to physician</b>	: Formic Acid  2D-LC Solution	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
<b>Specific treatments</b>	: Formic Acid 2D-LC Solution	No specific treatment. No specific treatment.
<b>Protection of first-aiders</b>	: Formic Acid  2D-LC Solution	No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an

## Section 4. First aid measures

appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

## Section 5. Firefighting measures

### Extinguishing media

**Suitable extinguishing media** : Formic Acid  
2D-LC Solution Use dry chemical, CO<sub>2</sub>, water spray (fog) or foam.  
Use dry chemical, CO<sub>2</sub>, water spray (fog) or foam.

**Unsuitable extinguishing media** : Formic Acid  
2D-LC Solution Do not use water jet.  
Do not use water jet.

**Specific hazards arising from the chemical** : Formic Acid

Flammable liquid and vapour. Runoff to sewer may create fire or explosion hazard. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapour/gas is heavier than air and will spread along the ground. Vapours may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back.

2D-LC Solution

Highly flammable liquid and vapour. Runoff to sewer may create fire or explosion hazard. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. This material is very toxic to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

**Hazardous thermal decomposition products** : Formic Acid

2D-LC Solution

Decomposition products may include the following materials:

carbon dioxide  
carbon monoxide

Decomposition products may include the following materials:

carbon dioxide  
carbon monoxide  
nitrogen oxides  
cyanides

**Special protective actions for fire-fighters** : Formic Acid

2D-LC Solution

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

## Section 5. Firefighting measures

<b>Special protective equipment for fire-fighters</b>	: Formic Acid  2D-LC Solution	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
<b>Hazchem code</b>	: Formic Acid 2D-LC Solution	2W 3YE

## Section 6. Accidental release measures

### Personal precautions, protective equipment and emergency procedures

<b>For non-emergency personnel</b>	: Formic Acid  2D-LC Solution	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Do not breathe vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
<b>For emergency responders</b>	: Formic Acid  2D-LC Solution	If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel". If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".
<b>Environmental precautions</b>	: Formic Acid  2D-LC Solution	Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities. Collect spillage.

### Methods and material for containment and cleaning up

## Section 6. Accidental release measures

<b>Methods for cleaning up</b>	: Formic Acid	Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
	2D-LC Solution	Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

## Section 7. Handling and storage

### Precautions for safe handling

<b>Protective measures</b>	: Formic Acid	Put on appropriate personal protective equipment (see Section 8). Do not get in eyes or on skin or clothing. Do not breathe vapour or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container.
	2D-LC Solution	Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapour or mist. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container.
<b>Advice on general occupational hygiene</b>	: Formic Acid	Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.
	2D-LC Solution	Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment



## Section 7. Handling and storage

**Conditions for safe storage, including any incompatibilities** : Formic Acid

2D-LC Solution

before entering eating areas. See also Section 8 for additional information on hygiene measures.

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 (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidising 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 unlabelled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

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 (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidising 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 unlabelled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

## Section 8. Exposure controls and personal protection

[Control parameters](#)

[Occupational exposure limits](#)

Ingredient name	Exposure limits
<b>Formic Acid</b> Formic acid	<b>Safe Work Australia (Australia, 10/2022).</b> STEL: 19 mg/m <sup>3</sup> 15 minutes. STEL: 10 ppm 15 minutes. TWA: 9.4 mg/m <sup>3</sup> 8 hours. TWA: 5 ppm 8 hours.
<b>2D-LC Solution</b> Acetonitrile	<b>Safe Work Australia (Australia, 10/2022).</b> <b>Absorbed through skin.</b> STEL: 101 mg/m <sup>3</sup> 15 minutes. STEL: 60 ppm 15 minutes. TWA: 67 mg/m <sup>3</sup> 8 hours. TWA: 40 ppm 8 hours.
Acetone	<b>Safe Work Australia (Australia, 10/2022).</b> STEL: 2375 mg/m <sup>3</sup> 15 minutes. STEL: 1000 ppm 15 minutes. TWA: 1185 mg/m <sup>3</sup> 8 hours. TWA: 500 ppm 8 hours.
Atrazine (ISO)	<b>Safe Work Australia (Australia, 10/2022).</b> <b>Skin sensitiser. Inhalation sensitiser.</b> TWA: 5 mg/m <sup>3</sup> 8 hours.
Diuron (ISO)	<b>Safe Work Australia (Australia, 10/2022).</b> TWA: 10 mg/m <sup>3</sup> 8 hours.
3-Cyclohexyl-6-dimethylamino-1-methyl-1,2,3,4-tetrahydro-	<b>ACGIH TLV (United States, 1/2023).</b>

## Section 8. Exposure controls and personal protection

1,3,5-triazine-2,4-dione

TWA: 3 mg/m<sup>3</sup> 8 hours. Form: Inhalable fraction

### Biological exposure indices

No exposure indices known.

- Appropriate engineering controls** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

### Individual protection measures

- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Eye/face protection** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.
- Skin protection**
- Hand protection** : 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.
- Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.


## Section 9. Physical and chemical properties and safety characteristics


The conditions of measurement of all properties are at standard temperature and pressure unless otherwise indicated.

### Appearance

- |                       |                                 |                               |
|-----------------------|---------------------------------|-------------------------------|
| <b>Physical state</b> | : Formic Acid<br>2D-LC Solution | Liquid. [Clear.]<br>Liquid.   |
| <b>Colour</b>         | : Formic Acid<br>2D-LC Solution | Colourless.<br>Not available. |
| <b>Odour</b>          | : Formic Acid<br>2D-LC Solution | Pungent.<br>Not available.    |

## Section 9. Physical and chemical properties and safety characteristics

<b>Odour threshold</b>	: Formic Acid	Not available.
	2D-LC Solution	Not available.
<b>pH</b>	: Formic Acid	Not available.
	2D-LC Solution	Not available.
<b>Melting point/freezing point</b>	: Formic Acid	4°C (39.2°F) [OECD 102]
	2D-LC Solution	Not available.
<b>Boiling point, initial boiling point, and boiling range</b>	: Formic Acid	100.23°C (212.4°F) [OECD 103]
	2D-LC Solution	Not available.
<b>Flash point</b>	: Formic Acid	Closed cup: 49.5°C (121.1°F) [DIN EN ISO 13736]
	2D-LC Solution	Closed cup: -18 to 23°C (-0.4 to 73.4°F)
<b>Evaporation rate</b>	: Formic Acid	1.14 (butyl acetate = 1)
	2D-LC Solution	Not available.
<b>Flammability</b>	: Formic Acid	Not applicable.
	2D-LC Solution	Not applicable.
<b>Lower and upper explosion limit/flammability limit</b>	: Formic Acid	Lower: 18%
		Upper: 51%
	2D-LC Solution	Not available.
<b>Vapour pressure</b>	:  Formic Acid	4.3 kPa (32.03522 mm Hg) [room temperature] [EU A.4]
		17.4 kPa (130.51 mm Hg) [50°C (122°F)]


Ingredient name	Vapour Pressure at 20°C			Vapour pressure at 50°C		
	mm Hg	kPa	Method	mm Hg	kPa	Method
 2D-LC Solution						
Acetone	180.01463	24	-	-	-	-
Acetonitrile	70.88853	9.5	-	-	-	-

**Relative vapour density** : Formic Acid 1.6 [Air = 1]  
2D-LC Solution Not available.

**Relative density** : Formic Acid 1.2  
2D-LC Solution Not available.

Media	Result
<b>Formic Acid</b>	
methanol	Soluble
diethyl ether	Soluble
acetone	Soluble
water	Soluble
<b>2D-LC Solution</b>	
water	Soluble

**Partition coefficient: n-octanol/water** : Formic Acid -2.3 [OECD 107]  
2D-LC Solution Not applicable.

**Auto-ignition temperature** :  Formic Acid 434°C (813.2°F)

Ingredient name	°C	°F	Method
<b>2D-LC Solution</b>			
Acetone	465	869	-
Acetonitrile	524	975.2	-

**Decomposition temperature** : Formic Acid 150 to 300°C (302 to 572°F)  
2D-LC Solution Not available.

## Section 9. Physical and chemical properties and safety characteristics

<b>Viscosity</b>	: Formic Acid	Dynamic (room temperature): 1.22 mPa·s (1.22 cP) [OECD 114] Kinematic (room temperature): 1.47 mm <sup>2</sup> /s (1.47 cSt) [OECD 114] Kinematic (40°C (104°F)): 1.02 mm <sup>2</sup> /s (1.02 cSt) [OECD 114]
	2D-LC Solution	Not available.
<b><u>Particle characteristics</u></b>		
<b>Median particle size</b>	: Formic Acid	Not applicable.
	2D-LC Solution	Not applicable.

## Section 10. Stability and reactivity

<b>Reactivity</b>	: Formic Acid	No specific test data related to reactivity available for this product or its ingredients.
	2D-LC Solution	No specific test data related to reactivity available for this product or its ingredients.
<b>Chemical stability</b>	: Formic Acid	The product is stable.
	2D-LC Solution	The product is stable.
<b>Possibility of hazardous reactions</b>	: Formic Acid	Under normal conditions of storage and use, hazardous reactions will not occur.
	2D-LC Solution	Under normal conditions of storage and use, hazardous reactions will not occur.
<b>Conditions to avoid</b>	: Formic Acid	Avoid all possible sources of ignition (spark or flame). Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapour to accumulate in low or confined areas.
	2D-LC Solution	Avoid all possible sources of ignition (spark or flame). Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.
<b>Incompatible materials</b>	: Formic Acid	Reactive or incompatible with the following materials: oxidising materials
	2D-LC Solution	Reactive or incompatible with the following materials: oxidising materials
<b>Hazardous decomposition products</b>	: Formic Acid	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
	2D-LC Solution	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## Section 11. Toxicological information

### Information on toxicological effects

#### Acute toxicity

## Section 11. Toxicological information

Product/ingredient name	Result	Species	Dose	Exposure
<b>Formic Acid</b> Formic acid	LC50 Inhalation Vapour LD50 Oral	Rat Rat	7400 mg/m <sup>3</sup> 730 mg/kg	4 hours -
<b>2D-LC Solution</b> Acetonitrile	LC50 Inhalation Vapour LD50 Oral	Rat Rat	17100 ppm 2460 mg/kg	4 hours -
Acetone	LD50 Oral	Rat	5800 mg/kg	-
Atrazine (ISO)	LC50 Inhalation Dusts and mists LD50 Dermal	Rat Rabbit	5200 mg/m <sup>3</sup> 7500 mg/kg	4 hours -
	LD50 Dermal	Rat	3 g/kg	-
	LD50 Oral	Rat	672 mg/kg	-
Diuron (ISO)	LC50 Inhalation Dusts and mists	Rat - Male, Female	>5.05 mg/l	4 hours
	LD50 Dermal	Rat	>5 g/kg	-
	LD50 Oral	Rat	1 g/kg	-
3-Cyclohexyl- 6-dimethylamino-1-methyl- 1,2,3,4-tetrahydro- 1,3,5-triazine-2,4-dione	LD50 Dermal	Rabbit	>5278 mg/kg	-
	LD50 Dermal	Rat	5278 mg/kg	-
	LD50 Oral	Rat	1690 mg/kg	-

### Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
<b>Formic Acid</b> Formic acid	Eyes - Severe irritant	Rabbit	-	122 mg	-
<b>2D-LC Solution</b> Acetonitrile	Eyes - Moderate irritant	Rabbit	-	24 hours 100 uL	-
Acetone	Eyes - Mild irritant	Rabbit	-	10 uL	-
	Eyes - Moderate irritant	Rabbit	-	24 hours 20 mg	-
	Skin - Mild irritant	Rabbit	-	395 mg	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 mg	-
Atrazine (ISO)	Eyes - Severe irritant	Rabbit	-	6320 ug	-
	Skin - Mild irritant	Rabbit	-	38 mg	-
3-Cyclohexyl- 6-dimethylamino-1-methyl- 1,2,3,4-tetrahydro- 1,3,5-triazine-2,4-dione	Eyes - Moderate irritant	Rabbit	-	48 mg	-

### Sensitisation

Not available.

### Mutagenicity

**Conclusion/Summary** : Not available.

### Carcinogenicity

**Conclusion/Summary** : Not available.

### Reproductive toxicity

**Conclusion/Summary** : Not available.

### Teratogenicity

**Conclusion/Summary** : Not available.

### Specific target organ toxicity (single exposure)

## Section 11. Toxicological information

Name	Category	Route of exposure	Target organs
<b>Formic Acid</b> Formic acid	Category 3	-	Respiratory tract irritation
<b>2D-LC Solution</b> Acetone	Category 3	-	Narcotic effects

### Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
<b>2D-LC Solution</b> Atrazine (ISO) Diuron (ISO)	Category 2 Category 2	- -	- -

### Aspiration hazard

Not available.

**Information on likely routes of exposure** : Formic Acid Routes of entry anticipated: Oral, Dermal, Inhalation, Eyes.  
2D-LC Solution Routes of entry anticipated: Oral, Dermal, Inhalation, Eyes.

### Potential acute health effects

**Eye contact** : Formic Acid Causes serious eye irritation.  
2D-LC Solution Causes serious eye irritation.

**Inhalation** : Formic Acid Toxic if inhaled. May cause respiratory irritation.  
2D-LC Solution Harmful if inhaled. Can cause central nervous system (CNS) depression. May cause drowsiness or dizziness.

**Skin contact** : Formic Acid Causes severe burns.  
2D-LC Solution Harmful in contact with skin.

**Ingestion** : Formic Acid Severely corrosive to the digestive tract. Causes severe burns. Harmful if swallowed.  
2D-LC Solution Harmful if swallowed. Can cause central nervous system (CNS) depression.

### Symptoms related to the physical, chemical and toxicological characteristics

**Eye contact** : Formic Acid Adverse symptoms may include the following:  
pain  
watering  
redness  
2D-LC Solution Adverse symptoms may include the following:  
pain or irritation  
watering  
redness

**Inhalation** : Formic Acid Adverse symptoms may include the following:  
respiratory tract irritation  
coughing  
2D-LC Solution Adverse symptoms may include the following:  
nausea or vomiting  
headache  
drowsiness/fatigue  
dizziness/vertigo  
unconsciousness

## Section 11. Toxicological information

<b>Skin contact</b>	: Formic Acid 2D-LC Solution	Adverse symptoms may include the following: pain or irritation redness blistering may occur No specific data.
<b>Ingestion</b>	: Formic Acid 2D-LC Solution	Adverse symptoms may include the following: stomach pains No specific data.

### Delayed and immediate effects as well as chronic effects from short and long-term exposure

#### Short term exposure

**Potential immediate effects** : Not available.

**Potential delayed effects** : Not available.

#### Long term exposure

**Potential immediate effects** : Not available.

**Potential delayed effects** : Not available.

#### Potential chronic health effects

<b>General</b>	: Formic Acid 2D-LC Solution	No known significant effects or critical hazards. No known significant effects or critical hazards.
<b>Carcinogenicity</b>	: Formic Acid 2D-LC Solution	No known significant effects or critical hazards. No known significant effects or critical hazards.
<b>Mutagenicity</b>	: Formic Acid 2D-LC Solution	No known significant effects or critical hazards. No known significant effects or critical hazards.
<b>Reproductive toxicity</b>	: Formic Acid 2D-LC Solution	No known significant effects or critical hazards. No known significant effects or critical hazards.

### Numerical measures of toxicity

#### Acute toxicity estimates

Product/ingredient name	Oral (mg/kg)	Dermal (mg/kg)	Inhalation (gases) (ppm)	Inhalation (vapours) (mg/l)	Inhalation (dusts and mists) (mg/l)
<b>Formic Acid</b> Formic acid	730	N/A	N/A	7.4	N/A
<b>2D-LC Solution</b> 2D-LC Solution	680.0	1496.0	N/A	15.0	N/A
Acetonitrile	500	1100	N/A	11	N/A
Acetone	5800	20000	N/A	76	N/A
Atrazine (ISO)	672	3000	N/A	N/A	5.2
Diuron (ISO)	1000	N/A	N/A	N/A	N/A
3-Cyclohexyl-6-dimethylamino-1-methyl-1,2,3,4-tetrahydro-1,3,5-triazine-2,4-dione	1690	5278	N/A	N/A	N/A

<b>Other information</b>	: 2D-LC Solution	Adverse symptoms may include the following: May cause skin sensitisation.
--------------------------	------------------	---

## Section 12. Ecological information

### Toxicity

Product/ingredient name	Result	Species	Exposure
<b>Formic Acid</b> Formic acid	Acute EC50 151200 µg/l Fresh water	Daphnia - <i>Daphnia magna</i> - Larvae	48 hours
	Acute LC50 80000 to 90000 µg/l Marine water	Crustaceans - <i>Carcinus maenas</i> - Adult	48 hours
	Acute NOEC ≥100 mg/l Fresh water	Daphnia - <i>Daphnia magna</i>	21 days
<b>2D-LC Solution</b> Acetonitrile	Acute IC50 3685000 µg/l Fresh water	Aquatic plants - <i>Lemna minor</i>	96 hours
	Acute LC50 3600000 µg/l Fresh water	Daphnia - <i>Daphnia magna</i>	48 hours
	Acute LC50 1000000 µg/l Fresh water	Fish - <i>Pimephales promelas</i>	96 hours
	Chronic NOEC 1000000 µg/l Fresh water	Aquatic plants - <i>Lemna minor</i>	96 hours
Acetone	Chronic NOEC 160000 µg/l Fresh water	Daphnia - <i>Daphnia magna</i>	21 days
	Acute EC50 7200000 µg/l Fresh water	Algae - <i>Selenastrum sp.</i>	96 hours
	Acute LC50 4.42589 ml/L Marine water	Crustaceans - <i>Acartia tonsa</i> - Copepodid	48 hours
	Acute LC50 7460000 µg/l Fresh water	Daphnia - <i>Daphnia cucullata</i>	48 hours
	Acute LC50 5600 ppm Fresh water	Fish - <i>Poecilia reticulata</i>	96 hours
	Chronic NOEC 4.95 mg/l Marine water	Algae - <i>Ulva pertusa</i>	96 hours
	Chronic NOEC 0.016 ml/L Fresh water	Crustaceans - <i>Daphniidae</i>	21 days
Atrazine (ISO)	Chronic NOEC 0.1 ml/L Fresh water	Daphnia - <i>Daphnia magna</i> - Neonate	21 days
	Acute EC50 4.3 µg/l Fresh water	Algae - <i>Chlorella vulgaris</i>	96 hours
	Acute EC50 11 µg/l Fresh water	Algae - <i>Scenedesmus acutus</i>	72 hours
	Acute EC50 0.0405 mg/l Fresh water	Aquatic plants - <i>Lemna minor</i>	96 hours
	Acute EC50 240 µg/l Fresh water	Daphnia - <i>Daphnia pulex</i>	48 hours
	Acute IC50 13.4 µg/l Marine water	Aquatic plants - <i>Zostera muelleri</i>	72 hours
	Acute LC50 373.9 µg/l Marine water	Crustaceans - <i>Acartia tonsa</i> - Adult	48 hours
	Acute LC50 1.25 ppm Fresh water	Fish - <i>Barbodes carnaticus</i>	96 hours
	Chronic IC10 1.17 µg/l Marine water	Aquatic plants - <i>Zostera muelleri</i>	72 hours
	Chronic NOEC 0.002 mg/l Fresh water	Algae - <i>Scenedesmus acutus var. acutus</i> - Exponential growth phase	3 days
Diuron (ISO)	Chronic NOEC 25 µg/l Fresh water	Crustaceans - <i>Ceriodaphnia sp.</i>	21 days
	Chronic NOEC 3 mg/l Fresh water	Daphnia - <i>Daphnia magna</i>	21 days
	Chronic NOEC 0.26 ppb Fresh water	Fish - <i>Poecilia reticulata</i> - Adult	16 weeks
	Acute EC50 0.0013 mg/l Fresh water	Algae - <i>Chlorella pyrenoidosa</i>	96 hours
	Acute EC50 2.26 µg/l Marine water	Algae - <i>Coccolithus huxleyi</i> - Exponential growth phase	72 hours
	Acute EC50 0.005 mg/l Fresh water	Aquatic plants - <i>Lemna sp.</i>	96 hours
	Acute EC50 7.2 mg/l Fresh water	Daphnia - <i>Daphnia magna</i> - Neonate	48 hours
	Acute IC50 2.41 µg/l Marine water	Aquatic plants - <i>Halodule uninervis</i>	72 hours
	Acute LC50 380 µg/l Fresh water	Crustaceans - <i>Gammarus lacustris</i>	48 hours
	Acute LC50 500 µg/l Fresh water	Fish - <i>Morone saxatilis</i> - Larvae	96 hours
Chronic EC10 0.11 µg/l Fresh water	Algae - <i>Fragilaria capucina</i> - Exponential growth phase	96 hours	
3-Cyclohexyl-6-dimethylamino-1-methyl-1,2,3,4-tetrahydro-1,3,5-triazine-2,4-dione	Chronic NOEC 0.34 µg/l Marine water	Aquatic plants - <i>Zostera muelleri</i>	72 hours
	Chronic NOEC 26.4 ppb	Fish - <i>Pimephales promelas</i>	60 days
	Acute EC50 0.073 mg/l Fresh water	Aquatic plants - <i>Lemna sp.</i>	96 hours
	Acute EC50 85 ppm Fresh water	Daphnia - <i>Daphnia magna</i>	48 hours
	Acute IC50 4.4 µg/l Marine water	Aquatic plants - <i>Zostera muelleri</i>	72 hours



## Section 12. Ecological information

	Acute LC50 71.6 mg/l Fresh water	Crustaceans - <i>Pacifastacus leniusculus</i> - Juvenile (Fledgling, Hatchling, Weanling)	48 hours
	Acute LC50 146.7 ppm Fresh water	Fish - <i>Oncorhynchus mykiss</i>	96 hours
	Chronic NOEC 0.37 µg/l Marine water	Aquatic plants - <i>Halodule uninervis</i>	72 hours
	Chronic NOEC 0.1 mg/l Fresh water	Crustaceans - <i>Copepoda</i>	21 days
	Chronic NOEC 20 ppm Fresh water	Daphnia - <i>Daphnia magna</i>	21 days
	Chronic NOEC 85.5 µg/l Fresh water	Fish - <i>Salmo salar</i> - Yolk-sac larvae	396 days

### Persistence and degradability

Product/ingredient name	Test	Result	Dose	Inoculum
<b>2D-LC Solution</b> Acetonitrile	OECD 310 Ready Biodegradability - CO2 in Sealed Vessels (Headspace Test)	70 % - Readily - 21 days	-	Activated sludge
Atrazine (ISO)	-	9.86 % - Not readily - 28 days	-	-
Diuron (ISO)	OECD 301F Ready Biodegradability - Manometric Respirometry Test	0 % - Not readily - 28 days	-	-

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
<b>Formic Acid</b> Formic acid	-	-	Readily
<b>2D-LC Solution</b> Acetonitrile	-	-	Readily
Acetone	-	-	Readily
Atrazine (ISO)	-	-	Not readily
Diuron (ISO)	-	-	Not readily

### Bioaccumulative potential

Product/ingredient name	LogP <sub>ow</sub>	BCF	Potential
<b>Formic Acid</b> Formic acid	-2.3	-	Low
<b>2D-LC Solution</b> Acetonitrile	-0.34	3	Low
Acetone	-0.23	3	Low
Atrazine (ISO)	2.59	7.94	Low
Diuron (ISO)	2.84	5.2	Low
3-Cyclohexyl- 6-dimethylamino-1-methyl- 1,2,3,4-tetrahydro- 1,3,5-triazine-2,4-dione	1.85	-	Low

### Mobility in soil

Soil/water partition coefficient (K<sub>oc</sub>) : Not available.





## Section 12. Ecological information

**Other adverse effects** : No known significant effects or critical hazards.

## Section 13. Disposal considerations

**Disposal methods** : The generation of waste should be avoided or minimised wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

## Section 14. Transport information

	ADG	IMDG	IATA
<b>UN number</b>	UN3316	UN3316	UN3316
<b>UN proper shipping name</b>	CHEMICAL KIT	CHEMICAL KIT	Chemical kit
<b>Transport hazard class(es)</b>	9 	9  	9 
<b>Packing group</b>	II	II	II
<b>Environmental hazards</b>	Yes. The environmentally hazardous substance mark is not required.	Yes.	Yes. The environmentally hazardous substance mark is not required.

### Additional information

- ADG** : **Hazchem code** 2Z  
**Special provisions** 251, 340
- IMDG** : The marine pollutant mark is not required when transported in sizes of ≤5 L or ≤5 kg.  
**Emergency schedules** F-A, \_S-P\_  
**Special provisions** 251, 340
- IATA** : The environmentally hazardous substance mark may appear if required by other transportation regulations.  
**Quantity limitation** Passenger and Cargo Aircraft: 10 kg. Packaging instructions: 960. Cargo Aircraft Only: 10 kg. Packaging instructions: 960. Limited Quantities - Passenger Aircraft: 1 kg. Packaging instructions: Y960.  
**Special provisions** A44, A163
- Special precautions for user** : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.
- Transport in bulk according to IMO instruments** : Not available.

## Section 15. Regulatory information

### Standard for the Uniform Scheduling of Medicines and Poisons

5

### Model Work Health and Safety Regulations - Scheduled Substances

No listed substance

### International regulations

#### Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

#### Montreal Protocol

Not listed.

#### Stockholm Convention on Persistent Organic Pollutants

Not listed.

#### Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

#### UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

### Inventory list

<b>Australia</b>	: Not determined.
<b>New Zealand</b>	: Not determined.
<b>United States</b>	: At least one component is inactive.

## Section 16. Any other relevant information

### History

**Date of issue/Date of revision** : 03/04/2024

**Date of previous issue** : 11/05/2023

**Version** : 4

**Key to abbreviations** :

- ADG = Australian Dangerous Goods
- ADR = The European Agreement concerning the International Carriage of Dangerous Goods by Road
- ATE = Acute Toxicity Estimate
- BCF = Bioconcentration Factor
- GHS = Globally Harmonized System of Classification and Labelling of Chemicals
- IATA = International Air Transport Association
- IBC = Intermediate Bulk Container
- IMDG = International Maritime Dangerous Goods
- LogPow = logarithm of the octanol/water partition coefficient
- MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
- N/A = Not available
- SUSMP = Standard Uniform Schedule of Medicine and Poisons
- UN = United Nations

### Procedure used to derive the classification

Classification	Justification
<b>Formic Acid</b> FLAMMABLE LIQUIDS - Category 3 ACUTE TOXICITY (oral) - Category 4 ACUTE TOXICITY (inhalation) - Category 3 SKIN CORROSION/IRRITATION - Category 1 SERIOUS EYE DAMAGE/EYE IRRITATION - Category 2A SPECIFIC TARGET ORGAN TOXICITY - SINGLE EXPOSURE (Respiratory tract irritation) - Category 3	On basis of test data Regulatory data On basis of test data Regulatory data On basis of test data Regulatory data

**Section 16. Any other relevant information**

<b>2D-LC Solution</b> FLAMMABLE LIQUIDS - Category 2 ACUTE TOXICITY (oral) - Category 4 ACUTE TOXICITY (dermal) - Category 4 ACUTE TOXICITY (inhalation) - Category 4 SERIOUS EYE DAMAGE/EYE IRRITATION - Category 2A SPECIFIC TARGET ORGAN TOXICITY - SINGLE EXPOSURE (Narcotic effects) - Category 3 SHORT-TERM (ACUTE) AQUATIC HAZARD - Category 1 LONG-TERM (CHRONIC) AQUATIC HAZARD - Category 1	Expert judgment Calculation method Calculation method Calculation method Calculation method Calculation method Calculation method Calculation method
--	---

✔ Indicates information that has changed from previously issued version.

**[Notice to reader](#)**

**Disclaimer:** The information contained in this document is based on Agilent's state of knowledge at the time of preparation. No warranty as to its accurateness, completeness or suitability for a particular purpose is expressed or implied.