

SAFETY DATA SHEET



2D-LC Easy Starter Kit, Part Number G4236-68000

Section 1. Identification

1.1 Product identifier

Product name : 2D-LC Easy Starter Kit, Part Number G4236-68000
Part no. (chemical kit) : G4236-68000
Part no. : Formic Acid G2453-85060
 2D-LC Solution 5190-6895
Validation date : 4/3/2024

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

Identified uses : Analytical reagent.
 Formic Acid 5 mL
 2D-LC Solution 1 x 2 mL

1.3 Details of the supplier of the safety data sheet

Supplier/Manufacturer : Agilent Technologies, Inc.
 5301 Stevens Creek Blvd
 Santa Clara, CA 95051, USA
 800-227-9770

1.4 Emergency telephone number

In case of emergency : CHEMTREC®: 1-800-424-9300

Section 2. Hazards identification

2.1 Classification of the substance or mixture

OSHA/HCS status : Formic Acid This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
 2D-LC Solution This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

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 - Category 1A
 H318 SERIOUS EYE DAMAGE - Category 1

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 EYE IRRITATION - Category 2A
 H317 SKIN SENSITIZATION - Category 1
 H351 CARCINOGENICITY - Category 2
 H360 TOXIC TO REPRODUCTION - Category 1B
 H336 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3
 H400 AQUATIC HAZARD (ACUTE) - Category 1
 H410 AQUATIC HAZARD (LONG-TERM) - Category 1

Section 2. Hazards identification

2.2 GHS label elements

Hazard pictograms

: Formic Acid



2D-LC Solution



Signal word

: Formic Acid
2D-LC SolutionDanger
Danger

Hazard statements

: Formic Acid

H226 - Flammable liquid and vapor.
 H302 - Harmful if swallowed.
 H314 - Causes severe skin burns and eye damage.
 H331 - Toxic if inhaled.

2D-LC Solution

H225 - Highly flammable liquid and vapor.
 H302 + H312 + H332 - Harmful if swallowed, in contact with skin or if inhaled.
 H317 - May cause an allergic skin reaction.
 H319 - Causes serious eye irritation.
 H336 - May cause drowsiness or dizziness.
 H351 - Suspected of causing cancer.
 H360 - May damage fertility or the unborn child.
 H410 - Very toxic to aquatic life with long lasting effects.

Precautionary statements

Prevention

: 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.
 P241 - Use explosion-proof electrical, ventilating or lighting equipment.
 P242 - Use non-sparking tools.
 P243 - Take action to prevent static discharges.
 P261 - Avoid breathing vapor.
 P270 - Do not eat, drink or smoke when using this product.

2D-LC Solution

P264 - Wash thoroughly after handling.
 P201 - Obtain special instructions before use.
 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.
 P241 - Use explosion-proof electrical, ventilating or lighting equipment.
 P242 - Use non-sparking tools.
 P243 - Take action to prevent static discharges.
 P273 - Avoid release to the environment.
 P261 - Avoid breathing vapor.
 P270 - Do not eat, drink or smoke when using this product.
 P264 - Wash thoroughly after handling.

Section 2. Hazards identification

Response	: Formic Acid	<p>P304 + P340, P310 - IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor.</p> <p>P301 + P310, P330, P331 - IF SWALLOWED: Immediately call a POISON CENTER or doctor. Rinse mouth. Do NOT induce vomiting.</p> <p>P303 + P361 + P353, P310 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. Immediately call a POISON CENTER or doctor.</p> <p>P363 - Wash contaminated clothing before reuse.</p> <p>P305 + P351 + P338, P310 - 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 or doctor.</p>
	2D-LC Solution	<p>P391 - Collect spillage.</p> <p>P308 + P313 - IF exposed or concerned: Get medical advice or attention.</p> <p>P304 + P312 - IF INHALED: Call a POISON CENTER or doctor if you feel unwell.</p> <p>P363 - Wash contaminated clothing before reuse.</p> <p>P302 + P312, P352 - IF ON SKIN: Call a POISON CENTER or doctor if you feel unwell. Wash with plenty of water.</p> <p>P333 + P313 - If skin irritation or rash occurs: Get medical advice or attention.</p> <p>P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.</p> <p>P337 + P313 - If eye irritation persists: Get medical advice or attention.</p>
Storage	: Formic Acid	<p>P403 + P235 - Store in a well-ventilated place. Keep cool.</p>
	2D-LC Solution	<p>P403 + P233 - Store in a well-ventilated place. Keep container tightly closed.</p> <p>P403 + P235 - Keep cool.</p>
Disposal	: Formic Acid	<p>P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.</p>
	2D-LC Solution	<p>P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.</p>
Supplemental label elements	: Formic Acid	<p>Keep container tightly closed. Do not breathe vapor or spray. Do not taste or swallow. Use only with adequate ventilation. Wash thoroughly after handling.</p>
	2D-LC Solution	None known.
<u>2.3 Other hazards</u>		
Hazards not otherwise classified	: Formic Acid	<p>Causes severe respiratory tract burns. Causes severe digestive tract burns.</p>
	2D-LC Solution	None known.

Section 3. Composition/information on ingredients

Substance/mixture : Formic Acid
2D-LC Solution

Substance
Mixture

Ingredient name	%	CAS number
Formic Acid		
Formic acid	100	64-18-6
2D-LC Solution		
Acetonitrile	≥50 - ≤75	75-05-8
Acetone	≥10 - ≤25	67-64-1
Atrazine (ISO)	≤0.3	1912-24-9
1,3,5-Triazine-2,4-diamine, 6-chloro-N(sup 2)-(1-methylethyl)-	≤0.3	6190-65-4
Chlorotoluron (ISO)	≤0.3	15545-48-9
Diuron (ISO)	≤0.3	330-54-1
3-Cyclohexyl-6-dimethylamino-1-methyl-1,2,3,4-tetrahydro-1,3,5-triazine-2,4-dione	≤0.3	51235-04-2
Linuron (ISO)	≤0.3	330-55-2
2-Chloro-N-(2,6-dimethylphenyl)-N-(1H-pyrazol-1-ylmethyl)acetamide	≤0.3	67129-08-2
Methabenzthiazuron (ISO)	≤0.3	18691-97-9
Metoxuron (ISO)	≤0.3	19937-59-8
prometryn	≤0.3	7287-19-6
Terbutylazine	≤0.3	5915-41-3
desethylterbutylazine	≤0.3	30125-63-4

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

4.1 Description of necessary first aid measures

Eye contact : Formic Acid

2D-LC Solution

Get medical attention immediately. Call a poison center or physician. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician.

Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

Section 4. First aid measures

Inhalation

: Formic Acid

Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing 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. 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.

2D-LC Solution

Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing 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.

Skin contact

: Formic Acid

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.

2D-LC Solution

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 necessary, call a poison center or physician. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion

: Formic Acid

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

Section 4. First aid measures

2D-LC Solution

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.

4.2 Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact	: Formic Acid 2D-LC Solution	Causes serious eye damage. Causes serious eye irritation.
Inhalation	: Formic Acid 2D-LC Solution	Toxic if inhaled. Severely corrosive to the respiratory system. Harmful if inhaled. Can cause central nervous system (CNS) depression. May cause drowsiness or dizziness.
Skin contact	: Formic Acid 2D-LC Solution	Causes severe burns. Harmful in contact with skin. May cause an allergic skin reaction.
Ingestion	: Formic Acid 2D-LC Solution	Severely corrosive to the digestive tract. Causes severe burns. May cause burns to mouth, throat and stomach. Harmful if swallowed. Harmful if swallowed. Can cause central nervous system (CNS) depression.

Over-exposure signs/symptoms

Eye contact	: 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
Inhalation	: 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 reduced fetal weight

Section 4. First aid measures

Skin contact	: Formic Acid	increase in fetal deaths skeletal malformations
	2D-LC Solution	Adverse symptoms may include the following: pain or irritation redness blistering may occur
Ingestion	: Formic Acid	Adverse symptoms may include the following: irritation redness reduced fetal weight increase in fetal deaths skeletal malformations
	2D-LC Solution	Adverse symptoms may include the following: stomach pains Adverse symptoms may include the following: reduced fetal weight increase in fetal deaths skeletal malformations

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

Notes to physician	: Formic Acid	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
	2D-LC Solution	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.
Specific treatments	: Formic Acid	No specific treatment.
	2D-LC Solution	No specific treatment.
Protection of first-aiders	: Formic Acid	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.
	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.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing media	: Formic Acid	Use dry chemical, CO ₂ , water spray (fog) or foam.
	2D-LC Solution	Use dry chemical, CO ₂ , water spray (fog) or foam.
Unsuitable extinguishing media	: Formic Acid	Do not use water jet.
	2D-LC Solution	Do not use water jet.

Section 5. Fire-fighting measures

5.2 Special hazards arising from the substance or mixture

Specific hazards arising from the chemical : Formic Acid

Flammable liquid and vapor. 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 vapor/gas is heavier than air and will spread along the ground. Vapors 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 vapor. 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

Decomposition products may include the following materials:

carbon dioxide
carbon monoxide

2D-LC Solution

Decomposition products may include the following materials:

carbon dioxide
carbon monoxide
nitrogen oxides
cyanides

5.3 Advice for firefighters

Special protective actions for fire-fighters : Formic Acid

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.

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.

Special protective equipment for fire-fighters : Formic Acid

Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

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.

Section 6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

: Formic Acid

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 spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Do not breathe vapor 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 spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

2D-LC Solution

For emergency responders

: Formic Acid

If specialized 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 specialized 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".

2D-LC Solution

6.2 Environmental precautions

: Formic Acid

Avoid dispersal of spilled 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).

2D-LC Solution

Avoid dispersal of spilled 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.

6.3 Methods and materials for containment and cleaning up

Methods for cleaning up

: 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

7.1 Precautions for safe handling

Protective measures : Formic Acid

Put on appropriate personal protective equipment (see Section 8). Do not get in eyes or on skin or clothing. Do not breathe vapor 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). Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Avoid exposure - obtain special instructions before use. Avoid exposure during pregnancy. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapor 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.

Advice on general occupational hygiene : Formic Acid

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

Section 7. Handling and storage

7.2 Conditions for safe storage, including any incompatibilities

: Formic Acid

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 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 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 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 containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

2D-LC Solution

7.3 Specific end use(s)

Recommendations

: Formic Acid
2D-LC SolutionIndustrial applications, Professional applications.
Industrial applications, Professional applications.

Industrial sector specific solutions

: Formic Acid
2D-LC SolutionNot available.
Not available.

Section 8. Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Formic Acid Formic acid	ACGIH TLV (United States, 1/2023). TWA: 5 ppm 8 hours. TWA: 9.4 mg/m ³ 8 hours. STEL: 10 ppm 15 minutes. STEL: 19 mg/m ³ 15 minutes. OSHA PEL 1989 (United States, 3/1989). TWA: 5 ppm 8 hours. TWA: 9 mg/m ³ 8 hours. NIOSH REL (United States, 10/2020). TWA: 5 ppm 10 hours. TWA: 9 mg/m ³ 10 hours. OSHA PEL (United States, 5/2018). TWA: 5 ppm 8 hours. TWA: 9 mg/m ³ 8 hours. CAL OSHA PEL (United States, 5/2018). STEL: 19 mg/m ³ 15 minutes.

Section 8. Exposure controls/personal protection

2D-LC Solution
Acetonitrile

STEL: 10 ppm 15 minutes.
TWA: 9 mg/m³ 8 hours.
TWA: 5 ppm 8 hours.

ACGIH TLV (United States, 1/2023).

Absorbed through skin.

TWA: 20 ppm 8 hours.

OSHA PEL 1989 (United States, 3/1989).

TWA: 40 ppm 8 hours.

TWA: 70 mg/m³ 8 hours.

STEL: 60 ppm 15 minutes.

STEL: 105 mg/m³ 15 minutes.

NIOSH REL (United States, 10/2020).

TWA: 20 ppm 10 hours.

TWA: 34 mg/m³ 10 hours.

OSHA PEL (United States, 5/2018).

TWA: 40 ppm 8 hours.

TWA: 70 mg/m³ 8 hours.

CAL OSHA PEL (United States, 5/2018).

Absorbed through skin.

STEL: 105 mg/m³ 15 minutes.

STEL: 60 ppm 15 minutes.

TWA: 70 mg/m³ 8 hours.

TWA: 40 ppm 8 hours.

Acetone

ACGIH TLV (United States, 1/2023).

TWA: 250 ppm 8 hours.

STEL: 500 ppm 15 minutes.

OSHA PEL 1989 (United States, 3/1989).

TWA: 750 ppm 8 hours.

TWA: 1800 mg/m³ 8 hours.

STEL: 1000 ppm 15 minutes.

STEL: 2400 mg/m³ 15 minutes.

NIOSH REL (United States, 10/2020).

TWA: 250 ppm 10 hours.

TWA: 590 mg/m³ 10 hours.

OSHA PEL (United States, 5/2018).

TWA: 1000 ppm 8 hours.

TWA: 2400 mg/m³ 8 hours.

CAL OSHA PEL (United States, 5/2018).

STEL: 1780 mg/m³ 15 minutes.

STEL: 750 ppm 15 minutes.

C: 3000 ppm

TWA: 1200 mg/m³ 8 hours.

TWA: 500 ppm 8 hours.

Atrazine (ISO)

OSHA PEL 1989 (United States, 3/1989).

TWA: 5 mg/m³ 8 hours.

NIOSH REL (United States, 10/2020).

TWA: 5 mg/m³ 10 hours.

ACGIH TLV (United States, 1/2023).

[Atrazine (and related symmetrical triazines)]

TWA: 2 mg/m³ 8 hours. Form: Inhalable fraction

CAL OSHA PEL (United States, 5/2018).

TWA: 5 mg/m³ 8 hours.

1,3,5-Triazine-2,4-diamine, 6-chloro-N(sup 2)-(1-methylethyl)-

None.

Section 8. Exposure controls/personal protection

Chlorotoluron (ISO) Diuron (ISO)	None. ACGIH TLV (United States, 1/2023). TWA: 10 mg/m ³ 8 hours. OSHA PEL 1989 (United States, 3/1989). TWA: 10 mg/m ³ 8 hours. NIOSH REL (United States, 10/2020). TWA: 10 mg/m ³ 10 hours. CAL OSHA PEL (United States, 5/2018). TWA: 10 mg/m ³ 8 hours.
3-Cyclohexyl-6-dimethylamino-1-methyl-1,2,3,4-tetrahydro-1,3,5-triazine-2,4-dione	ACGIH TLV (United States, 1/2023). TWA: 3 mg/m ³ 8 hours. Form: Inhalable fraction
Linuron (ISO) 2-Chloro-N-(2,6-dimethylphenyl)-N-(1H-pyrazol-1-ylmethyl)acetamide	None. None.
Methabenzthiazuron (ISO) Metoxuron (ISO) prometryn	None. None. ACGIH TLV (United States, 1/2023). TWA: 1 mg/m ³ 8 hours. Form: Inhalable fraction
Terbutylazine desethylterbutylazine	None. None.

Biological exposure indices

Ingredient name	Exposure indices
2D-LC Solution Acetone	ACGIH BEI (United States, 1/2023) BEI: 25 mg/l, acetone [in urine]. Sampling time: end of shift.

8.2 Exposure controls

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

Section 8. Exposure controls/personal 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

Physical state	: Formic Acid 2D-LC Solution	Liquid. [Clear.] Liquid.
Color	: Formic Acid 2D-LC Solution	Colorless. Not available.
Odor	: Formic Acid 2D-LC Solution	Pungent. Not available.
Odor threshold	: Formic Acid 2D-LC Solution	Not available. Not available.
pH	: Formic Acid 2D-LC Solution	Not available. Not available.
Melting point/freezing point	: Formic Acid 2D-LC Solution	4°C (39.2°F) [OECD 102] Not available.
Boiling point, initial boiling point, and boiling range	: Formic Acid 2D-LC Solution	100.23°C (212.4°F) [OECD 103] Not available.
Flash point	: Formic Acid 2D-LC Solution	Closed cup: 49.5°C (121.1°F) [DIN EN ISO 13736] Closed cup: -18 to 23°C (-0.4 to 73.4°F)
Evaporation rate	: Formic Acid 2D-LC Solution	1.14 (butyl acetate = 1) Not available.
Flammability	: Formic Acid 2D-LC Solution	Not applicable. Not applicable.
Lower and upper explosion limit/flammability limit	: Formic Acid 2D-LC Solution	Lower: 18% Upper: 51% Not available.
Vapor pressure	: 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)]

Section 9. Physical and chemical properties and safety characteristics

Ingredient name	Vapor Pressure at 20°C			Vapor 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 vapor density : Formic Acid 1.6 [Air = 1]
2D-LC Solution Not available.

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

Solubility(ies) :

Media	Result
Formic Acid	
methanol	Soluble
diethyl ether	Soluble
acetone	Soluble
water	Soluble
2D-LC Solution	
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
2D-LC Solution			
Acetone	465	869	-
Acetonitrile	524	975.2	-

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

Viscosity : Formic Acid Dynamic (room temperature): 1.22 mPa·s (1.22 cP) [OECD 114]
Kinematic (room temperature): 1.47 mm²/s (1.47 cSt) [OECD 114]
Kinematic (40°C (104°F)): 1.02 mm²/s (1.02 cSt) [OECD 114]
2D-LC Solution Not available.

Particle characteristics

Median particle size : Formic Acid Not applicable.
2D-LC Solution Not applicable.

Section 10. Stability and reactivity

10.1 Reactivity : 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.

10.2 Chemical stability : Formic Acid The product is stable.
2D-LC Solution The product is stable.

Section 10. Stability and reactivity

10.3 Possibility of hazardous reactions	: 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.
10.4 Conditions to avoid	: Formic Acid	Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas.
	2D-LC Solution	Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.
10.5 Incompatible materials	: Formic Acid	Reactive or incompatible with the following materials: oxidizing materials
	2D-LC Solution	Reactive or incompatible with the following materials: oxidizing materials
10.6 Hazardous decomposition products	: 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

11.1 Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Formic Acid Formic acid	LC50 Inhalation Vapor	Rat	7400 mg/m ³	4 hours
	LD50 Oral	Rat	730 mg/kg	-
2D-LC Solution Acetonitrile	LC50 Inhalation Vapor	Rat	17100 ppm	4 hours
	LD50 Oral	Rat	2460 mg/kg	-
Acetone	LD50 Oral	Rat	5800 mg/kg	-
Atrazine (ISO)	LC50 Inhalation Dusts and mists	Rat	5200 mg/m ³	4 hours
	LD50 Dermal	Rabbit	7500 mg/kg	-
	LD50 Dermal	Rat	3 g/kg	-
Chlorotoluron (ISO)	LD50 Oral	Rat	672 mg/kg	-
	LD50 Oral	Rat	5800 mg/kg	-
	LC50 Inhalation Dusts and mists	Rat - Male, Female	>5.05 mg/l	4 hours
Diuron (ISO)	LD50 Dermal	Rat	>5 g/kg	-
	LD50 Oral	Rat	1 g/kg	-
	LD50 Dermal	Rabbit	>5278 mg/kg	-
3-Cyclohexyl-6-dimethylamino-1-methyl-1,2,3,4-tetrahydro-1,3,5-triazine-2,4-dione	LD50 Dermal	Rat	5278 mg/kg	-
	LD50 Oral	Rat	1690 mg/kg	-
	LC50 Inhalation Dusts and mists	Rat	48 mg/m ³	4 hours
Linuron (ISO)				

Section 11. Toxicological information

2-Chloro-N-(2,6-dimethylphenyl)-N-(1H-pyrazol-1-ylmethyl)acetamide	LD50 Dermal	Rabbit	>5 g/kg	-
	LD50 Oral	Rat	1146 mg/kg	-
	LD50 Dermal	Rat	>6810 mg/kg	-
Metoxuron (ISO) prometryn Terbuthylazine	LD50 Oral	Rat	1 g/kg	-
	LD50 Oral	Rat	1600 mg/kg	-
	LD50 Oral	Rat	1802 mg/kg	-
	LC50 Inhalation Dusts and mists	Rat	>5.3 mg/l	4 hours
	LD50 Dermal	Rat	>2000 mg/kg	-
	LD50 Oral	Rat	1845 mg/kg	-

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Formic Acid Formic acid	Eyes - Severe irritant	Rabbit	-	122 mg	-
2D-LC Solution 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 prometryn	Eyes - Moderate irritant	Rabbit	-	48 mg	-
	Eyes - Mild irritant	Rabbit	-	80 mg	-

Sensitization

Not available.

Mutagenicity

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

Product/ingredient name	OSHA	IARC	NTP
2D-LC Solution Atrazine (ISO)	-	3	-

Reproductive toxicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
2D-LC Solution Acetone	Category 3	-	Narcotic effects

Specific target organ toxicity (repeated exposure)

Section 11. Toxicological information

Name	Category	Route of exposure	Target organs
2D-LC Solution Atrazine (ISO) Diuron (ISO) Linuron (ISO) Terbuthylazine	Category 2 Category 2 Category 2 Category 2	oral inhalation - -	heart blood system blood system -

Aspiration hazard

Not available.

Information on the likely routes of exposure : Formic Acid
2D-LC Solution

Routes of entry anticipated: Oral, Dermal, Inhalation, Eyes.
Routes of entry anticipated: Oral, Dermal, Inhalation, Eyes.

Potential acute health effects

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

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

Skin contact : Formic Acid
2D-LC Solution
Causes severe burns.
Harmful in contact with skin. May cause an allergic skin reaction.

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

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : 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

Inhalation : 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
reduced fetal weight
increase in fetal deaths
skeletal malformations

Section 11. Toxicological information

Skin contact	: Formic Acid	Adverse symptoms may include the following: pain or irritation redness blistering may occur
	2D-LC Solution	Adverse symptoms may include the following: irritation redness reduced fetal weight increase in fetal deaths skeletal malformations
Ingestion	: Formic Acid	Adverse symptoms may include the following: stomach pains
	2D-LC Solution	Adverse symptoms may include the following: reduced fetal weight increase in fetal deaths skeletal malformations

Delayed and immediate effects and also 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

General	: Formic Acid 2D-LC Solution	No known significant effects or critical hazards. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.
Carcinogenicity	: Formic Acid 2D-LC Solution	No known significant effects or critical hazards. Suspected of causing cancer. Risk of cancer depends on duration and level of exposure.
Mutagenicity	: Formic Acid 2D-LC Solution	No known significant effects or critical hazards. No known significant effects or critical hazards.
Reproductive toxicity	: Formic Acid 2D-LC Solution	No known significant effects or critical hazards. May damage fertility or the unborn child.

Numerical measures of toxicity

Acute toxicity estimates

Product/ingredient name	Oral (mg/kg)	Dermal (mg/kg)	Inhalation (gases) (ppm)	Inhalation (vapors) (mg/l)	Inhalation (dusts and mists) (mg/l)
Formic Acid Formic acid	730	N/A	N/A	7.4	N/A
2D-LC Solution 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
1,3,5-Triazine-2,4-diamine, 6-chloro-N(sup 2)-	500	N/A	N/A	11	N/A

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(1-methylethyl)-Chlorotoluron (ISO)	5800	N/A	N/A	N/A	N/A
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
Linuron (ISO)	1146	N/A	N/A	N/A	0.048
2-Chloro-N-(2,6-dimethylphenyl)-N-(1H-pyrazol-1-ylmethyl)acetamide	1000	N/A	N/A	N/A	N/A
Metoxuron (ISO)	1600	N/A	N/A	N/A	N/A
prometryn	1802	N/A	N/A	N/A	N/A
Terbuthylazine	1845	2500	N/A	N/A	N/A

Other information : 2D-LC Solution

Adverse symptoms may include the following: May cause skin sensitization.

Section 12. Ecological information

12.1 Toxicity

Product/ingredient name	Result	Species	Exposure
Formic Acid 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
2D-LC Solution 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
	Chronic NOEC 160000 µg/l Fresh water	Daphnia - <i>Daphnia magna</i>	21 days
Acetone	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
	Chronic NOEC 0.1 ml/L Fresh water	Daphnia - <i>Daphnia magna</i> - Neonate	21 days
Atrazine (ISO)	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
	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
1,3,5-Triazine-2,4-diamine,	Acute EC50 821 µg/l Fresh water	Algae - <i>Chlorella fusca ssp. fusca</i>	96 hours

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6-chloro-N(sup 2)-(1-methylethyl)-Chlorotoluron (ISO)	Acute EC50 0.018 mg/l Fresh water	- Exponential growth phase	
	Acute LC50 35 ppm Fresh water	Algae - <i>Scenedesmus quadricauda</i>	96 hours
	Chronic NOEC 10 µg/l Fresh water	Fish - <i>Oncorhynchus mykiss</i>	96 hours
		Algae - <i>Chlorella pyrenoidosa</i> - Exponential growth phase	96 hours
Diuron (ISO)	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
	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
3-Cyclohexyl-6-dimethylamino-1-methyl-1,2,3,4-tetrahydro-1,3,5-triazine-2,4-dione	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
	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
Linuron (ISO)	Acute EC50 6 µg/l Fresh water	Algae - <i>Scenedesmus acutus</i>	3 days
	Acute EC50 0.12 ppm Fresh water	Daphnia - <i>Daphnia magna</i>	48 hours
	Acute LC50 0.89 ppm Marine water	Fish - <i>Cyprinodon variegatus</i>	96 hours
	Chronic EC10 1.2 µg/l Fresh water	Algae - <i>Scenedesmus acutus</i>	3 days
	Chronic NOEC 4.3 to 5.1 µg/l Fresh water	Crustaceans - <i>Crustacea</i>	21 days
	Chronic NOEC 0.13 ppm Fresh water	Daphnia - <i>Daphnia magna</i>	21 days
	Chronic NOEC 1 µg/l Fresh water	Fish - <i>Pimephales promelas</i> - Adult	28 days
2-Chloro-N-(2,6-dimethylphenyl)-N-(1H-pyrazol-1-ylmethyl)acetamide	Acute EC50 0.647 mg/l	Algae - <i>Prorocentrum minimum</i> - Exponential growth phase	72 hours
	Chronic NOEC 0.01 mg/l	Algae - <i>Prorocentrum minimum</i> - Exponential growth phase	72 hours
Methabenzthiazuron (ISO)	Acute EC50 0.033 mg/l Fresh water	Algae - <i>Scenedesmus quadricauda</i>	96 hours
Metoxuron (ISO)	Acute LC50 122000 µg/l Fresh water	Crustaceans - <i>Cyclops strenuus</i>	48 hours
	Acute LC50 160000 µg/l Fresh water	Daphnia - <i>Daphnia magna</i>	48 hours
	Acute LC50 40 mg/l Fresh water	Fish - <i>Rasbora heteromorpha</i>	96 hours
prometryn	Acute EC50 0.00165 mg/l Fresh water	Algae - <i>Scenedesmus acutus var. acutus</i>	96 hours
	Acute EC50 9700 µg/l Fresh water	Daphnia - <i>Daphnia magna</i>	48 hours

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Terbuthylazine	Acute LC50 17 mg/l Fresh water	Crustaceans - <i>Pacifastacus leniusculus</i> - Juvenile (Fledgling, Hatchling, Weanling)	48 hours
	Acute LC50 2300 µg/l Fresh water	Fish - <i>Danio rerio</i> - Larvae	96 hours
	Chronic NOEC 2.5 µg/l Fresh water	Algae - <i>Chlamydomonas reinhardtii</i>	4 days
	Chronic NOEC 1 ppm Fresh water	Daphnia - <i>Daphnia magna</i>	21 days
	Chronic NOEC 0.51 µg/l Fresh water	Fish - <i>Carassius sp.</i> - Juvenile (Fledgling, Hatchling, Weanling)	60 days
desethylterbutylazine	Acute EC50 0.016 mg/l Fresh water	Algae - <i>Desmodesmus subspicatus</i> - Exponential growth phase	72 hours
	Acute EC50 100 to 150 µg/l Fresh water	Aquatic plants - <i>Lemna minor</i>	3 days
	Acute EC50 21.2 ppm Fresh water	Daphnia - <i>Daphnia magna</i>	48 hours
	Acute LC50 1.6 ppm Fresh water	Fish - <i>Poecilia reticulata</i>	96 hours
	Chronic NOEC 5 µg/l Marine water	Algae - <i>Skeletonema marinoi</i>	4 days
	Chronic NOEC 820 µg/l Fresh water	Fish - <i>Cyprinus carpio</i> - Embryo	30 days
	Chronic NOEC 1.8 µg/l Fresh water	Fish - <i>Cyprinus carpio</i> - Egg	36 days

12.2 Persistence and degradability

Product/ingredient name	Test	Result	Dose	Inoculum
2D-LC Solution Acetonitrile	OECD 310 Ready Biodegradability - CO ₂ 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
Formic Acid Formic acid	-	-	Readily
2D-LC Solution Acetonitrile	-	-	Readily
Acetone	-	-	Readily
Atrazine (ISO)	-	-	Not readily
Diuron (ISO)	-	-	Not readily

12.3 Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
Formic Acid Formic acid	-2.3	-	Low
2D-LC Solution Acetonitrile	-0.34	3	Low
Acetone	-0.23	3	Low
Atrazine (ISO)	2.59	7.94	Low
1,3,5-Triazine-2,4-diamine,	1.51	-	Low

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6-chloro-N(sup 2)-(1-methylethyl)-Chlorotoluron (ISO)	2.41	-	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
Linuron (ISO)	3.2	17.78	Low
2-Chloro-N-(2,6-dimethylphenyl)-N-(1H-pyrazol-1-ylmethyl)acetamide	2.13	-	Low
Methabenzthiazuron (ISO)	2.64	-	Low
Metoxuron (ISO)	1.64	-	Low
prometryn	3.51	-	Low
Terbutylazine	3.21	-	Low

12.4 Mobility in soil

Soil/water partition coefficient (K_{oc}) : Not available.

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

Section 13. Disposal considerations

13.1 Waste treatment methods

Disposal methods : The generation of waste should be avoided or minimized 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 spilled material and runoff and contact with soil, waterways, drains and sewers.

United States - RCRA Toxic hazardous waste "U" List

Ingredient	CAS #	Status	Reference number
Formic Acid Formic acid (C,T)	64-18-6	Listed	U123
2D-LC Solution Acetonitrile (I,T)	75-05-8	Listed	U003
Acetone (I)	67-64-1	Listed	U002

Disposal should be in accordance with applicable regional, national and local laws and regulations. Local regulations may be more stringent than regional or national requirements.








The information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Section 13. Disposal considerations

for additional handling information and protection of employees.

Section 14. Transport information

	DOT Classification	TDG Classification	Mexico Classification	IMDG	IATA
UN number	UN3316	UN3316	UN3316	UN3316	UN3316
UN proper shipping name	Chemical kit	CHEMICAL KIT	EQUIPO QUIMICO	CHEMICAL KIT	Chemical kit
Transport hazard class(es)	9 	9  	9 	9  	9 
Packing group	II	II	II	II	II
Environmental hazards	No.	Yes.	Yes. The environmentally hazardous substance mark is not required.	Yes.	Yes. The environmentally hazardous substance mark is not required.

Additional information

DOT Classification

- : **Reportable quantity** 10000 lbs / 4540 kg. The classification of the product is due solely to the presence of one or more US DOT-listed 'Hazardous substances' that are subject to reportable quantity requirements and only applies to shipments of packages greater than, or equal to, the product reportable quantity. Package sizes less than the product reportable quantity are not regulated as hazardous materials.
- : **Limited quantity** Yes.
- : **Packaging instruction** Exceptions: 161. Non-bulk: 161. Bulk: None.
- : **Quantity limitation** Passenger aircraft/rail: 10 kg. Cargo aircraft: 10 kg.
- : **Special provisions** 15

TDG Classification

- : Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.43-2.45 (Class 9), 2.7 (Marine pollutant mark). The marine pollutant mark is not required when transported by road or rail.
- : **Passenger Carrying Road or Rail Index** 10
- : **Special provisions** 65, 141

Mexico Classification

- : **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

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

U.S. Federal regulations : TSCA 8(a) PAIR: Acetonitrile; Atrazine (ISO); Diuron (ISO); Terbutylazine
 TSCA 8(a) CDR Exempt/Partial exemption: Not determined
 Clean Water Act (CWA) 307: Acetonitrile
 Clean Water Act (CWA) 311: Formic acid; Diuron (ISO)

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification	:	Formic Acid	FLAMMABLE LIQUIDS - Category 3 ACUTE TOXICITY (oral) - Category 4 ACUTE TOXICITY (inhalation) - Category 3 SKIN CORROSION - Category 1A SERIOUS EYE DAMAGE - Category 1 HNOC - Corrosive to digestive tract [severe] HNOC - Corrosive to respiratory tract [severe]
		2D-LC Solution	FLAMMABLE LIQUIDS - Category 2 ACUTE TOXICITY (oral) - Category 4 ACUTE TOXICITY (dermal) - Category 4 ACUTE TOXICITY (inhalation) - Category 4 EYE IRRITATION - Category 2A SKIN SENSITIZATION - Category 1 CARCINOGENICITY - Category 2 TOXIC TO REPRODUCTION - Category 1B SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2

Composition/information on ingredients

Name	%	Classification
Formic Acid Formic acid	100	FLAMMABLE LIQUIDS - Category 3 ACUTE TOXICITY (oral) - Category 4 ACUTE TOXICITY (inhalation) - Category 3 SKIN CORROSION - Category 1A SERIOUS EYE DAMAGE - Category 1 HNOC - Corrosive to digestive tract [severe] HNOC - Corrosive to respiratory tract [severe]
2D-LC Solution Acetonitrile	≥50 - ≤75	FLAMMABLE LIQUIDS - Category 2 ACUTE TOXICITY (oral) - Category 4 ACUTE TOXICITY (dermal) - Category 4 ACUTE TOXICITY (inhalation) - Category 4 EYE IRRITATION - Category 2A

Section 15. Regulatory information

Acetone	≥10 - ≤25	FLAMMABLE LIQUIDS - Category 2 EYE IRRITATION - Category 2A SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3 HNOC - Defatting irritant
Atrazine (ISO)	≤0.3	ACUTE TOXICITY (oral) - Category 4 EYE IRRITATION - Category 2A SKIN SENSITIZATION - Category 1
Chlorotoluron (ISO)	≤0.3	SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2 COMBUSTIBLE DUSTS CARCINOGENICITY - Category 2
Diuron (ISO)	≤0.3	TOXIC TO REPRODUCTION - Category 2 ACUTE TOXICITY (oral) - Category 4 CARCINOGENICITY - Category 2
Linuron (ISO)	≤0.3	SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2 ACUTE TOXICITY (oral) - Category 4 ACUTE TOXICITY (inhalation) - Category 1 CARCINOGENICITY - Category 2
2-Chloro-N-(2,6-dimethylphenyl)-N-(1H-pyrazol-1-ylmethyl)acetamide	≤0.3	TOXIC TO REPRODUCTION - Category 1B SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2 ACUTE TOXICITY (oral) - Category 4 SKIN SENSITIZATION - Category 1B CARCINOGENICITY - Category 2
desethylterbutylazine	≤0.3	SKIN SENSITIZATION - Category 1

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	Formic Acid Formic acid	64-18-6	100
	2D-LC Solution Acetonitrile	75-05-8	≥50 - ≤75
Supplier notification	Formic Acid Formic acid	64-18-6	100
	2D-LC Solution Acetonitrile	75-05-8	≥50 - ≤75

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

- Massachusetts** : The following components are listed: FORMIC ACID; ACETONITRILE; ACETONE
- New York** : The following components are listed: Formic acid; Acetonitrile; Acetone
- New Jersey** : The following components are listed: FORMIC ACID; ACETONITRILE; ACETONE
- Pennsylvania** : The following components are listed: FORMIC ACID; ACETONITRILE; 2-PROPANONE

California Prop. 65

⚠ WARNING: This product can expose you to chemicals including Diuron, which is known to the State of California to cause cancer, and Atrazine, Des-ethyl atrazine, Linuron, Nifedipine and Nimodipine, which are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Ingredient name	No significant risk level	Maximum acceptable dosage level
2D-LC Solution		
Atrazine	-	Yes.
Des-ethyl atrazine	-	Yes.
Diuron	-	-
Linuron	-	Yes.
Nifedipine	-	-
Nimodipine	-	-

Section 15. Regulatory information

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

Australia	: Not determined.
Canada	: Not determined.
China	: Not determined.
Japan	: Japan inventory (CSCL): Not determined. Japan inventory (ISHL): Not determined.
New Zealand	: Not determined.
Philippines	: Not determined.
Republic of Korea	: Not determined.
Taiwan	: Not determined.
Thailand	: Not determined.
Turkey	: Not determined.
United States	: At least one component is inactive.
Viet Nam	: Not determined.

Section 16. Other information

Procedure used to derive the classification

Classification	Justification
Formic Acid FLAMMABLE LIQUIDS - Category 3 ACUTE TOXICITY (oral) - Category 4 ACUTE TOXICITY (inhalation) - Category 3 SKIN CORROSION - Category 1A SERIOUS EYE DAMAGE - Category 1	On basis of test data On basis of test data On basis of test data Expert judgment Expert judgment
2D-LC Solution FLAMMABLE LIQUIDS - Category 2 ACUTE TOXICITY (oral) - Category 4 ACUTE TOXICITY (dermal) - Category 4 ACUTE TOXICITY (inhalation) - Category 4 EYE IRRITATION - Category 2A SKIN SENSITIZATION - Category 1 CARCINOGENICITY - Category 2 TOXIC TO REPRODUCTION - Category 1B SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3 AQUATIC HAZARD (ACUTE) - Category 1 AQUATIC HAZARD (LONG-TERM) - Category 1	Expert judgment Calculation method Calculation method Calculation method Calculation method Calculation method Calculation method Calculation method Calculation method Calculation method Calculation method Calculation method

Section 16. Other information

History

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

Date of previous issue : 05/11/2023

Version : 3

Key to abbreviations

: 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

UN = United Nations

✔ Indicates information that has changed from previously issued version.

Notice to reader

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