



TIDE INTERNATIONAL USA, INC.

—A DIVISION OF TIDE GROUP

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Material Safety Data Sheet (MSDS)

MSDS# TIC-HER8422921

Date: 02/01/2012

Section 1 - Product Chemical and Company Identification

Product name	Tide Clethodim 2EC
Chemical Class	Cyclohexanediones
Product Use	Systemic herbicide
Company	Tide International USA, Inc.
EPA Reg. No.	84229-21
Emergency phone	Chemtrec 1-800-424-9300 Tide International USA, Inc. 1-949-679-3535

Section 2 - Composition /Information on Ingredients

Active Ingredient	CAS number	w/w %
Clethodim (±)-2-[(E)-1-[(E)-3-chloroallyloxyimino]propyl]-5-[2-(ethylthio)propyl]-3-hydroxycyclohex-2-enon	99129-21-2	26.4 min.
Other ingredients		73.6 max
Total Hydrocarbons	64742-94-5	
Naphthalene	91-20-3	

Section 3 - Hazards Identification

Emergency overview

WARNING

Causes substantial but temporary eye irritation. Avoid contact with skin. Do not get in eyes, on skin, or on clothing. Harmful if swallowed or inhaled. Avoid breathing vapors or spray mist. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

Potential health effects

Signs and Symptoms of Systemic Effects: Signs of toxicity in test animals exposed to lethal or near-lethal oral doses included lethargy, ataxia, irregular breathing, lacrimation and loose stools. This product contains a solvent mixture. Solvents, when inhaled, can cause nasal and respiratory irritation and central nervous system effects including dizziness, weakness, fatigue, nausea, headache and possibly unconsciousness and even death. Ingestion of solvents can cause gastrointestinal irritation, nausea, vomiting and diarrhea. Aspiration of low viscosity products can cause chemical pneumonitis, which can be fatal. Acute exposure to naphthalene



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by inhalation, ingestion, and dermal contact has been associated with hemolytic anemia, damage to the kidneys, cataracts, and, in infants, brain damage.

Eye: Based on an evaluation of the ingredients and/or similar products, this product is expected to cause prolonged and/or significant irritation. The degree of injury will depend on the amount and duration of contact and the speed and thoroughness of the first aid treatment. The expected adverse health effects resulting from an exposure may include redness, swelling and pain, which could last for an extended period of time.

Skin: Based on an evaluation of the similar products, this product is expected to cause moderate skin irritation. The degree of injury will depend on the amount and duration of contact and the speed and thoroughness of the first aid treatment. The expected adverse health effects resulting from an exposure may include redness and swelling. This product may cause allergic skin reactions. In sensitized individuals even small exposures can trigger allergic reactions. The expected adverse health effects may include itching, redness, swelling and blistering of the skin. This product is expected to be minimally toxic when absorbed through the skin. The degree of injury will depend on the amount of material inhaled and the speed and thoroughness of the first aid treatment. The expected adverse systemic health effects are described above.

Ingestion: Based on an evaluation of the ingredients and/or similar products, this product is expected to be slightly toxic when ingested. The degree of injury will depend on the amount of material ingested and the speed and thoroughness of the first aid treatment. The expected adverse systemic health effects are described above. Ingestion of this product may cause gastrointestinal irritation, nausea, vomiting and diarrhea. Because of the low viscosity of this substance, it can directly enter the lungs if it is swallowed (this is called aspiration). This can occur during the act of swallowing or when vomiting the substance. Once in the lungs, the substance is very difficult to remove and can cause injury to the lungs and death.

Inhalation: Exposure to high concentrations may result in respiratory irritation. Signs and symptoms may include, but not be limited to, nasal discharge, sore throat, coughing and difficulty in breathing. Based on an evaluation of the ingredients and/or similar products, this product is expected to be minimally toxic when inhaled. The degree of injury will depend on the amount of material inhaled and the speed and thoroughness of the first aid treatment. The expected adverse systemic health effects are described above.

Chronic Toxicity (Including Cancer): Increased liver weights and anemia have been observed in animals exposed to Clethodim Technical. Clethodim Technical was not carcinogenic to animals. Prolonged or repeated dermal exposures may cause drying, scaling and even blistering of the skin. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Symptoms include fatigue, concentration difficulties, anxiety, depression, rapid mood swings and short-term memory loss. The reports are not clear with regard to the types of solvents that may cause these symptoms, and there is controversy among scientists to whether the condition



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exists or is caused by this type of product. Since many other diseases cause some or all of these conditions, a doctor should be consulted if any appear. This product contains naphthalene which has been listed by the International Agency for Research on Cancer (IARC) as possibly carcinogenic to humans (Group 2B).

Teratology (Birth Defects) Information: Clethodim Technical produced developmental toxicity only at maternally toxic dose levels. It is not expected to present a hazard under normal use conditions. There is limited evidence of fetal and maternal toxicity from exposure to naphthalene.

Reproduction Information: No reproductive toxicity was observed in animals exposed to Clethodim Technical.

Potentially Aggravated Condition: Individuals with preexisting diseases of the liver, red blood cell and central nervous system may have increased susceptibility to the toxicity of excessive exposures.

For complete discussion of the toxicology data from which this evaluation was made, refer to Section 11. For regulatory Information, refer to Section 15.

Section 4 - First Aid Measures

If poisoning occurs, immediately contact a doctor or Poisons Information Centre, and follow the advice given. Show this Material Safety Data Sheet to the doctor.

If in eyes:

Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

If on skin or Clothing:

Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

If swallowed: □

Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor. Do not give anything by mouth to an unconscious person.

If inhaled: □

Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control center or doctor for further treatment advice.

Note to physician:

Ingestion of this product or subsequent vomiting may result in aspiration of light hydrocarbon liquid which can cause pneumonitis. If ingested, probable mucosal damage may contraindicate the use of gastric lavage.



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Section 5 - Fire Fighting Measures

Flashpoint: 52.8°C (127° F)

Flammable limits (% in air): Not determined

Autoignition temperature: Not determined

Fire fighting instructions: Liquid evaporates and forms vapor (fumes), which can catch fire and burn with explosive violence. Invisible vapor spreads easily and can be set on fire by many sources such as pilot lights, welding equipment, and electrical motors and switches. Fire hazard is greater as liquid temperature rises above 85°F. Products of combustion from fires involving this material may be toxic. Avoid breathing smoke and mists. Avoid personnel and equipment contact with fallout and runoff. Minimize the amount of water used for fire fighting. Do not enter any enclosed area without full protective equipment, including self-contained breathing equipment. Contain and isolate runoff and debris for proper disposal. Decontaminate personal protective equipment and fire fighting equipment before reuse. Read the entire document.

Hazardous combustion products: Normal combustion forms carbon dioxide, water vapor and may produce oxides of nitrogen, sulfur. Combustion may produce toxic compounds of chlorine. Incomplete combustion can produce carbon monoxide.

Section 6 - Accidental Release Measures

Small spills

Wear protective equipment to prevent skin and eye contamination. Avoid inhalation of vapors. Wipe up with absorbent (clean rag or paper towels). Collect and seal in properly labeled containers or drums for disposal.

Large spills

Slippery when spilt. Avoid accidents, clean up immediately. Wear protective equipment to prevent skin and eye contamination and the inhalation of vapors. Work up wind or increase ventilation. Contain – prevent run off into drains and waterways. Use absorbent (soil, sand or other inert material). Collect and seal in properly labeled containers or drums for disposal. If contamination of sewers or waterways has occurred advise local emergency services.

Section 7- Handling and Storage

Handling: Avoid skin and eye contact and inhalation of vapour.

Storage: Store in a cool, dry, well ventilated place and out of direct sunlight. Store away from incompatible materials described in Section 10. Store away from sources of heat or ignition. Keep containers closed when not in use - check regularly for leaks.

Section 8 - Exposure Controls/Personal Protection

Eye protection: Appropriate eye protection must be worn when working with this material or



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serious harm can result. Wear protective eyewear.

Respiration/ventilation: This material may be a respiratory irritant and, unless ventilation is adequate, the use of approved respiratory protection is recommended. Use this material only in well ventilated areas.

Skin protection: Do not get on skin or clothing. Skin contact should be avoided by wearing protective clothing including chemical resistant gloves, long sleeved shirt, long pants, shoes and socks. Discard clothing and other absorbent materials that may have been drenched or heavily contaminated with this product's concentrate. Do not reuse them.

Section 9 - Physical and Chemical Properties

Appearance: Light yellow liquid

Odor: Aromatic odor

Formula: C₁₇H₂₆ClNO₃S

Melting point: Not Applicable

Boiling point: No Data Available

Density: 0.96±0.02 g/mL

pH: 3.0-6.0

Solubility: Emulsifies in water

Vapor pressure: Not Applicable

Dissociation constant: Not Applicable

Octanol/water partition coefficient: Not Applicable

These physical data are typical values based on material test but may vary from sample to sample. Typical values should not construed as a guaranteed analysis and any specific lot or as specification items.

Section 10 - Stability and Reactivity

Chemical stability: This material is thermally unstable.

Conditions to avoid: Elevated temperatures and sources of ignition.

Incompatible Materials: Oxidizing agents.

Hazardous decomposition products: Oxides of carbon and nitrogen, smoke and other toxic fumes.

Hazardous reactions: No information available.

Section 11 - Toxicological Information (Based on the active Ingredient)

Acute oral toxicity LD₅₀ for female rat 1360 mg/kg, male rats 1630mg/kg

Acute dermal toxicity LD₅₀ for rabbits > 5000mg/kg

Acute inhalation toxicity LC₅₀ (4h) >4.6 mg/L

Skin irritation Non-irritant (rabbit)



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Eye irritation	No product specific data available
Sensitization	No product specific data available

Subchronic toxicity (clethodim): Compound-related effects at high doses were decreased body weights, increased liver size and anemia

Carcinogenicity (clethodim): Similar effects as seen in subchronic. No treatment related increases in neoplasms were observed in any study.

Teratogenicity (clethodim): Developmental toxicity in rats and rabbits was observed only at maternally toxic dose levels.

Reproduction (clethodim): No reproductive toxicity was observed in a study with rats exposed for two generations.

Mutagenicity (clethodim): Negative in the following genotoxicity assays: microbial reverse mutation (Ames Assay), **in vitro** chromosome aberration assay in Chinese Hamster Ovary Cells, **in vivo** chromosome aberration assay in Rat Bone Marrow Cells and **in vivo** Unscheduled DNA Synthesis Assay. Clethodim does not present a genetic hazard to intact animal systems.

Toxicity of other ingredients: This product contains a solvent mixture. Solvents, when inhaled, can cause nasal and respiratory irritation and central nervous system effects including dizziness, weakness, fatigue, nausea, headache, and possibly unconsciousness and even death. Ingestion of solvents can cause gastrointestinal irritation, nausea, vomiting, and diarrhea. Prolonged or repeated dermal exposures may cause drying, scaling, and even blistering of the skin. Aspiration of low viscosity products can cause chemical, which can be fatal. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Symptoms include fatigue, concentration difficulties, anxiety, depression, rapid mood swings and short-term memory loss. The reports are not clear with regard to the types of solvents that may cause these symptoms, and there is controversy among scientists to whether the condition exists or is caused by this type of product. Since many other diseases cause some or all of these conditions, a doctor should be consulted if any appear.

Acute exposure to naphthalene by inhalation, ingestion, and dermal contact has been associated with hemolytic anemia, damage to the kidneys, cataracts, and in infants, brain damage. There is limited evidence of fetal and maternal toxicity from exposure to naphthalene.

Chronic (long-term) exposure of workers and rodents to naphthalene has been reported to cause cataracts and damage to the retina. Lesions in the kidneys and thymus, signs of anemia, and reduced spleen weights have been observed in rats and mice chronically exposed via gavage.

For a summary of the potential for adverse health effects from exposure to this product, refer to Section 3. For information regarding regulations pertaining to this product, refer to Section 15.



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Section 12 - Ecological Information (Based on the active Ingredient)

Avian toxicity: The acute toxicity of Clethodim Technical to birds is very low.

Bobwhite quail oral LD₅₀ greater than 2 g/kg

Bobwhite quail dietary LC₅₀ greater than 6000 ppm

Mallard duck dietary LC₅₀ greater than 6000 ppm

No reproductive effects were observed in mallard ducks exposed to 100 ppm of Clethodim Technical. In Bobwhite quail, a slight decrease in viability of embryos of eggs from females exposed to 1000 ppm was observed. A NOEL was established at 300 ppm for this study.

Aquatic organism toxicity: Clethodim Technical is only slightly toxic to freshwater fish and practically nontoxic to daphnia.

Rainbow Trout 96-hour LC₅₀ = 67 mg/l

Bluegill Sunfish 96-hour LC₅₀ = 120 mg/l

Daphnia magna 48-hour LC₅₀ greater than 120 mg/l

Other non-target organism toxicity: Clethodim Technical was found to be nontoxic to adult worker bees at the highest dose tested, 100 micrograms/bee.

Section 13 - Disposal Considerations

End users must dispose of any unused product as per the label recommendations.

Product disposal methods: Wastes resulting from the use of this product must be disposed of on-site or at an approved waste disposal facility. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

Container disposal: Nonrefillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying.

(Nonrefillable < 5 gallons): Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container ¼ full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Then offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

(Nonrefillable > 5 gallons): Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. Then offer for recycling if available or



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puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

Section 14 - Transport Information

D.O.T.SHIPPING NAME: Compounds, weed killing, liquid, non-regulated.

TECHNICAL SHIPPING NAME: Clethodim 26.4% EC

D.O.T.HAZARD CLASS: NA

U.N./N.A.NUMBER: NA

RMARKS: Regulated when shipping in bulk (>119 gal).

(If in bulk: Combustible liquid, n.o.s., [Contains Naphthalene], NA 1993, III, RQ)

EXCEPTION REQUIREMENT: 49CFR 173.150

Section 15 - Regulatory Information

All pesticides are governed under FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act). Therefore, the regulations presented below are pertinent only when handled outside of the normal use and applications of pesticides. This includes waste streams resulting from manufacturing/formulation facilities, spills or misuse of products, and storage of large quantities of products containing hazardous or extremely hazardous substances.

Section 16 - Other Information

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, expressed or implied, is made with respect to the information contained herein. Tide International USA, Inc. assumes no responsibility for results obtained or for incidental or consequential damages arising from the use of these data.