



# MATERIAL SAFETY DATA SHEET

## Kafy 12 EC

### IDENTIFICATION OF THE SUPPLIER:

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### PRODUCT IDENTIFICATION:

**Common Name:** Clethodim 12% w/v  
**Trade Name:** Kafy 12 EC  
**Uses category:** Herbicide  
**Type of formulation:** Emulsifiable Concentrate (EC)  
**Chemical Name:** (±)-2-[(E)-1-[(E)-3-chloroallyloxyimino]propyl]-5-[2-(ethylthio)propyl]-3-hydroxycyclohex-2-enone  
**Chemical Formula:** C<sub>17</sub>H<sub>26</sub>ClNO<sub>3</sub>S  
**Molecular Weight:** 359.9

### PRODUCT COMPOSITION:

<b>Active Ingredient:</b>	<b>% w/v</b>	<b>CAS #</b>
Clethodim	12 %	[99129-21-2]
<b>Inert materials:</b>	<b>up to 1 liter</b>	





## HAZARDS IDENTIFICATION:

### EMERGENCY OVERVIEW

**WARNING:** - causes substantial but temporary eye irritation

- Causes skin irritation
- Harmful if swallowed or absorbed through the skin
- Avoid breathing vapors or spray mist
- Aspiration hazard, do not induce vomiting
- May cause allergic skin reactions
- Do not get in eyes, on skin or on clothing
- Keep out of reach of children

### Potential health effects

#### Acute toxicity (primary routes of exposure)

Signs and symptoms of systemic effects: signs of toxicity in test animals exposed to lethal or near-lethal oral doses included salivation, diarrhea, and incoordination. 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.

**EYE:** this product has been shown to cause prolonged or significant eye 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:** this product has been shown to cause prolonged or significant 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, swelling and pain which could last for an extended period of time. Based on an evaluation of the ingredients and/ or similar products, this product may cause allergic skin reactions. In sensitized individuals even





small exposures can trigger allergic reaction. The expected adverse health effects may include itching, redness, swelling and blistering of the skin. This product has been shown 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:** this product has been shown 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 exposure 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 exists or is caused by this type of product. Since many other disease cause some or all of these conditions, a doctor should be consulted if any appear.

**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.

**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.

**FIRST-AID MEASURES:**

**EYES:** flush eyes immediately with fresh water for at least 15 minutes while holding eyelids open. Remove contact lenses if worn. Get medical attention.

**SKIN:** remove contaminated clothing. Wash skin thoroughly with soap and water. See a doctor if any signs or symptoms described in this document occur. Discard contaminated non- waterproof shoes and boots. Wash contaminated clothing separately.

**INGESTION:** if swallowed, don't induce vomiting. Call a physician or poison control center. Promptly drink a large quantity of milk, egg whites or gelatin solution. If these are not available, drink large quantities of water. Avoid alcohol. Get medical attention immediately.

**INHALATION:** if respiratory discomfort or irritation occurs, move the person to fresh air, see a doctor if discomfort or irritation continues. If not breathing, give artificial respiration, preferably mouth to mouth. Get medical attention.





### NOTES TO PHYSICIAN:

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

### FIRE-FIGHTING MEASURES: -

**FLASH POINT:** 46 °C      **METHOD:** setaflash closed cup

**AUTOIGNITION:** NDA

**EXTINGUISHING MEDIA:** CO<sub>2</sub>, dry chemical, foam, water fog.

**FLAMMABLE LIMITS (% by volume in air):** LOWER: NDA    UPPER: NDA

**NFOA RATINGS:** Health 2; Flammability 2; Reactivity 1; Special none (Least-0, Slight-1, Moderate-2, High-3, Extreme-4). These values are obtained using professional judgement. Values were not available in the guidelines or published evaluations prepared by the National Fire Protection Association, NFPA.

### 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.

Don't 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.

### HAZARD 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.





## ACCIDENTAL RELEASE MEASURE:

**Stop the source of the spill if safe to do so. Contain the spill to prevent further contamination of the soil, surface water, or ground water.**

### FOR SPILL ON LAND:

**CONTAINMENT:** avoid runoff into storm sewers and ditches which lead to waterways. Contain spilled liquids with dry sorbents.

**CLEANUP:** clean up spill immediately. Absorb spill with inert material (such as dry sand or earth), then place in a chemical waste container. Wash area with soap and water. Pick up wash liquid with additional absorbent and place in a chemical waste container.

### FOR SPILL IN WATER:

**CONTAINMENT:** this material forms an emulsion in water. Stop or reduce contamination of any water. Isolate contaminated water.

**CLEANUP:** remove contaminated water for treatment or disposal.

## PERSONAL PROTECTION/SAFETY:

**END USER MUST READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL.**

**EYE PROTECTION:** appropriate eye protection must be worn when working with this material or 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:** Don't 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 products concentrate, don't reuse them.





## HANDLING AND STORAGE:

### END USER MUST READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL.

Don't use or store near flame, sparks or hot surfaces. Use only in well ventilated area. Keep container closed.

Don't weld, heat or drill container. Replace cap or bung. Emptied container still contains hazardous or explosive vapor or liquid.

Keep pesticide in original container. Don't store or transport near food or feed. Don't contaminate food or feed. Don't put concentrate into food or drink containers. Don't dilute concentrate in food or drink containers. Store in a cool, dry place, out of direct sunlight.

## STABILITY AND REACTIVITY:

**CHEMICAL STABILITY:** Unstable at extreme pHs, temperature and upon exposure to UV light.

**INCOMPATIBILITY:** may react with strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

**OXIDATION/ REDUCTION PROPERTIES:** not an oxidizing or reducing agent.

## PHYSICAL AND CHEMICAL PROPERTIES:

**Appearance:** light yellow liquid

**Odor:** mild aromatic odor

**Density:** 0.93 g/ ml

**PH:** 3.6

**Corrosion:** not corrosive.

## TOXICOLOGICAL INFORMATION:

### ACUTE TOXICITY:

**Oral toxicity:** the oral LD50 in rats is 4.8 g/kg for females and greater than 5.0 g/kg for males. (Toxicity Category III) signs of toxicity at lethal or near lethal doses included salivation, diarrhea and incoordination.







**Dermal toxicity:** the dermal LD50 in rabbits is greater than 5 g/kg. (Toxicity category IV)

**Inhalation toxicity:** the 4- hour LC50 in rats is greater than 5.4 mg/l (toxicity category IV), this product is also expected to be a respiratory irritant.

**Eye irritation:** this product produced mild iritis and severe irritation in rabbits which cleared within 21 days (toxicity Category II).

**Skin irritation:** this product produced severe skin irritation in rabbits (Toxicity category II).

**Skin sensitization:** no product specified data available. based on a review of the ingredients and/ or similar products, this product may be a skin sensitizer.

**Toxicity clethodim technical:**

**Subchronic:** compound – related effects, noted at high doses of clethodim technical in subchronic toxicity studies conducted in mice, rats and dogs were decreased body weights increased liver size (increased liver weights and hypertrophy) and anemia (decreased hemoglobin, hematocrit, or erythrocyte counts)

**Chronic / carcinogenicity:**

In chronic studies with clethodim technical in the mouse, rats, and dogs similar effects as seen in subchronic have been noted. No treatment related increases in neoplasms were observed in any study.

**Teratology / Developmental toxicity:**

Developmental toxicity in rats and rabbits was observed only at maternally toxic dose levels of clethodim technical.

**Reproduction:**

No reproductive toxicity was observed in a study with rats exposed to clethodim technical for two generations.

**Mutagenicity:**

Clethodim technical was 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 Technical doesn't present a genetic hazard to intact animal systems.







## ECOLOGICAL INFORMATION: -

**AVINA 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 1000 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/ bees.

### **ENVIRONMENTAL FATE**

**Breakdown of Chemical in Soil and Groundwater:** Clethodim is of low persistence in most soils with a reported half-life of approximately 3 days. Breakdown is mainly by aerobic processes, although photolysis may make some contribution.

**Breakdown of Chemical in Surface Water:** Clethodim may be highly persistent in the aquatic environment.

Reported half-lives for Clethodim in the aquatic environment are 128 days in the aqueous phase and 214 days in the sediment. The reported hydrolysis half-life at pH 7-9 is approximately 300 days.

**Breakdown of Chemical in Vegetation:** Clethodim is rapidly degraded on the leaf surfaces by an acid-catalysed reaction and photolysis. Remaining Clethodim will rapidly penetrate the cuticle and enter the plant.





## DISPOSAL CONSIDERATIONS:

**Disposal:** There are many pieces of legislation covering waste disposal and they differ in each state and territory, so each user must refer to laws operating in their area. In some areas, certain wastes must be tracked. The Hierarchy of Controls seems to be common - the user should investigate: Reduce, Reuse, and Recycle and only if all else fails should disposal be considered. Note that properties of a product may change in use, so that the following suggestions may not always be appropriate. The following may help you in properly addressing this matter for this product. Special help is available for the disposal of Agricultural Chemicals. The product label will give general advice regarding disposal of small quantities, and how to cleanse containers

