



Material Safety Data Sheet

ENVOY® Herbicide

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This Material Safety Data Sheet (MSDS) serves different purposes than and DOES NOT REPLACE OR MODIFY THE EPA-APPROVED PRODUCT LABELING (attached to and accompanying the product container). This MSDS provides important health, safety, and environmental information for employers, employees, emergency responders and others handling large quantities of the product in activities generally other than product use, while the labeling provides that information specifically for product use in the ordinary course.

Use, storage and disposal of pesticide products is regulated by the EPA under the authority of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) through the product labeling. All necessary and appropriate precautionary, use, storage, and disposal information is set forth on that labeling. It is a violation of federal law to use a pesticide product in any manner not prescribed on the EPA-approved label.

SECTION 1: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: ENVOY® Herbicide
VC NUMBER(S): VC-1041
EPA REGISTRATION NUMBER: 59639-78
SYNONYM(S): None

MANUFACTURER
VALENT USA CORPORATION
P.O. Box 8025
1333 N. California Blvd., Suite 600
Walnut Creek, CA 94596-8025

EMERGENCY TELEPHONE NUMBERS
HEALTH EMERGENCY OR SPILL (24 hr):
(800) 892-0099
TRANSPORTATION (24 hr.): CHEMTREC
(800) 424-9300 or (202) 483-7616

PRODUCT INFORMATION

AGRICULTURAL PRODUCTS: (800) 6VALENT
PROFESSIONAL PRODUCTS: (800) 89VALENT

SECTION 2: COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient Name (CAS #) [Chemical Name]	Weight Percent	Exposure Limit	Ref.
CLETHODIM* (99129-21-2) [(E)-2{1-{{(3-chloro-2-propenyl)oxy}imino}propyl}-5-{2-(ethyl-thio)propyl}-3-hydroxy-2-cyclohexen-1-one]	12 - 13	None	---
NAPHTHALENE (91-20-3)	5 - 9	10 ppm TWA 15 ppm STEL	OSHA & ACGIH
TOTAL HYDROCARBONS (64742-94-5)	70 – 80	100 ppm	Mfgr.
Other**	1 -15	None	---

* Active Ingredient

** Other ingredients, which are maintained as trade secrets, are any substances other than an active ingredient contained in this product. Some of these may be hazardous, but their identity is withheld because they are considered trade secrets. The hazards associated with the other ingredients are addressed in this document. Specific information on other ingredients for the management of exposures, spills, or safety assessments can be obtained by a treating physician or nurse by calling **1-800-892-0099** at any time.

SECTION 3: 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. 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.

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 reactions. 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 exposures may cause drying, scaling and even blistering of the skin. 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.

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.

This product contains naphthalene which has been listed by the International Agency for Research on Cancer (IARC) as possibly carcinogenic to humans (Group 2B).

Trimethyl benzene may affect the liver and may cause changes in the blood cells and affect the blood's clotting ability. Trimethyl benzene can irritate the lungs. Repeated exposures may cause bronchitis to develop with cough, phlegm, and/or shortness of breath.

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

EMERGENCY NUMBER (800) 892-0099

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, DO NOT 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.

SECTION 5: FIRE FIGHTING MEASURES

FLASH POINT: 147° F (64° C) **METHOD:** Setaflash Closed Cup
AUTOIGNITION: NDA
EXTINGUISHING MEDIA: CO₂, dry chemical, foam, water fog.

FLAMMABLE LIMITS (% by volume in air): Lower: NDA Upper: NDA

NFPA 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. 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

VALENT EMERGENCY PHONE NUMBER: (800) 892-0099
CHEMTREC EMERGENCY PHONE NUMBER: (800) 424-9300
OBSERVE PRECAUTIONS IN SECTION 8: PERSONAL PROTECTION

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 SPILLS 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 SPILLS 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.

SECTION 7: HANDLING AND STORAGE

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

DO NOT USE OR STORE near flame, sparks or hot surfaces. Use only in well ventilated area. Keep container closed.

DO NOT weld, heat or drill container. Replace cap or bung. Emptied container still contains hazardous or explosive vapor or liquid.

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

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

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: 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:	mild aromatic odor.
MELTING POINT:	NA
BOILING POINT:	NDA
DENSITY:	0.93 g/ml @ 20° C (7.76 lb/gal)
SOLUBILITY:	Emulsifies in water
VAPOR PRESSURE:	NA
DISSOCIATION CONSTANT:	NA
OCTANOL/WATER PARTITION COEFFICIENT:	NA
pH:	4 – 5 as 1% emulsion in distilled water
VISCOSITY:	14 cps @ 25° C
CORROSION CHARACTERISTICS:	Not corrosive to high density polyethylene.

SECTION 10: STABILITY AND REACTIVITY

CHEMICAL STABILITY: Unstable at extreme pH's, temperature and upon exposure to UV light.

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

IMPACT EXPLODABILITY: No sensitivity to mechanical impact.

OXIDATION/REDUCTION PROPERTIES: Not an oxidizing or reducing agent.

SECTION 11: TOXICOLOGICAL INFORMATION

ACUTE (Product Specific Information):

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)

Dermal Toxicity: The dermal LD₅₀ in rabbits is greater than 5 g/kg. (Toxicity Category IV)

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.

Inhalation Toxicity: No product specific toxicology data available. The 4-hour LC₅₀ in rats for a similar formulation Select 2 EC Herbicide was greater than 5.4 mg/l. (Toxicity Category IV) This product is also expected to be a respiratory irritant.

Skin Sensitization: No product specific data available. Based on a review of the ingredients and/or similar products, this product may be a skin sensitizer.

TOXICITY OF 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, rat, and dog, 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 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 pneumonitis 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 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. Naphthalene has been listed by the International Agency for Research on Cancer (IARC) as possibly carcinogenic to humans (Group 2B).

Trimethyl benzene may affect the liver and may cause changes in the blood cells and affect the blood's clotting ability. Trimethyl benzene can irritate the lungs. Repeated exposures may cause bronchitis to develop with cough, phlegm, and/or shortness of breath.

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.

SECTION 12: ECOLOGICAL INFORMATION

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 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/bee.

SECTION 13: DISPOSAL CONSIDERATIONS

END USERS MUST DISPOSE OF ANY UNUSED PRODUCT AS PER THE LABEL RECOMMENDATIONS.

DISPOSAL METHODS: Check governmental regulations and local authorities for approved disposal of this material. Dispose in accordance with applicable laws and regulations.

SECTION 14: TRANSPORT INFORMATION

D.O.T. SHIPPING NAME: Compounds, weed killing, liquid, non-regulated.
TECHNICAL SHIPPING NAME: Clethodim 12% Solution
RQ: 159 gal
D.O.T. HAZARD CLASS: NA
U.N./N.A. NUMBER: NA
REMARKS: Regulated when shipped in bulk (> 119 gal).
EXCEPTION REQUIREMENT: 49 CFR 173.150

SECTION 15: REGULATORY INFORMATION

REGULATIONS UNDER FIFRA: 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.

OTHER U.S. FEDERAL REGULATIONS:

OSHA: See Section 2
CERCLA RQ*: Product RQ = 37 gal (based on glycol ethers); glycol ethers RQ = 1 lb, naphthalene RQ = 100 lb
RCRA:** Naphthalene waste code = U165
SARA TITLE III:
Sara (313) Chemicals: 1,2,4 trimethylbenzene, naphthalene, glycol ethers
Sara (311,312):
 Immediate Health Effects: YES
 Chronic Health Effects: YES
 Fire Hazard: YES
 Sudden Release of Pressure: NO
 Reactivity Hazard: NO
Sara Section 302: NA

Section 311 Clean Water Act: A component of this product is classified as an oil under Section 311 of the Clean Water Act (40 CFR 110) and the Oil Pollution Act of 1990. Discharge or spills that produce a visible sheen on either surface or in Waterways/sewers that lead to surface water must be reported to the National Response Center at 800-424-8802.

This product contains naphthalene which has been listed by the International Agency for Research on Cancer (IARC) as possibly carcinogenic to humans (Group 2B).

STATE REGULATIONS: Each state may promulgate standards more stringent than the federal government. This section cannot encompass an inclusive list of all state regulations. Therefore, the user should consult state or local authorities.

PROPOSITION 65: WARNING: This product contains naphthalene which is known to the State of California to cause cancer.

* RQ: Reportable Quantity

** RCRA waste codes must be determined on a case-by-case basis (i.e., spill, processing waste, etc.).

For information regarding potential adverse health effects from exposure to this product, refer to Sections 3 and 11.

SECTION 16: OTHER INFORMATION

REASON FOR ISSUE:	Revised Sections 3, 11 and 15 to reflect naphthalene being listed as a Group 2B carcinogen by IARC and changed the Proposition 65 statement to reflect results of the risk assessment.
REVISION NUMBER:	5
REVISION DATE:	02/21/2003
SUPERSEDES DATE:	08/16/1999
MSDS NUMBER:	0121

THE INFORMATION IN THIS MSDS IS BASED ON DATA AVAILABLE TO US AS OF THE REVISION DATE GIVEN HEREIN, AND BELIEVED TO BE CORRECT. CONTACT VALENT USA CORPORATION TO CONFIRM IF YOU HAVE THE MOST CURRENT MSDS.

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