Material Safety Data Sheet

ENVOY® Plus Herbicide

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, and 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.

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: ENVOY® Plus Herbicide
VC NUMBER(S): 1463
ITEM: 86773
SYNONYM(S): None
EPA REGISTRATION NUMBER: 59639-132

MANUFACTURER
VALENT USA CORPORATION
P.O. Box 8025
1600 Riviera Avenue, Suite 200
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) 682-5368
PROFESSIONAL PRODUCTS: (800) 898-2536

The current MSDS is available through our website or by calling the product information numbers listed above. (www.valent.com)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Weight/ Percent	ACGIH Exposure Limits	OSHA Exposure Limits
Clethodim ((E)-2-[1-[[(3-chloro-2-propenyl)oxy]imino]propyl]-5-[2-(ethylthio)propyl]-3-hydroxy-2-2cyclohenen-1-one) * (99129-21-2)	12 - 14	None	None
Total hydrocarbons (64742-94-5)	45 - 48	100 mg/m³ (17 ppm) TWA	Manufacturers recommended exposure limit
Naphthalene (91-20-3)	<5	10 ppm TWA, 15 ppm STEL skin - potential for absorption	10 ppm TWA,15 ppm STEL 50 mg/m³ TWA, 75 mg/m³ STEL
Others ** (No CAS#)	39 - 42	None	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.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

CAUTION

- May cause moderate eye irritation.
- May cause skin and respiratory irritation.
- Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.
- Harmful if swallowed.
- Aspiration hazard, do not induce vomiting.
- Combustible.
- Avoid breathing vapors or spray mist.
- Avoid contact with eyes, skin and clothing.
- Keep out of reach of children.

POTENTIAL HEALTH EFFECTS

Acute Toxicity (Primary Routes of Exposure)

Signs and Symptoms of Systemic Effects: 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 solvents 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.

Acute Eye Contact: This product is a moderate eye irritant. Adverse health effects resulting from an exposure may include redness, swelling and pain which could last for an extended period of time.

Acute Skin Contact: This product can cause moderate skin irritation. The expected adverse health effects resulting from an exposure may include redness and swelling. This product is minimally toxic when absorbed through the skin. 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.

Acute Ingestion: This product is minimally toxic when ingested. 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.

Acute Inhalation: This product is minimally toxic when inhaled.

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 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).

Developmental Toxicity (birth defects): 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.

Reproductive Toxicity: No reproductive toxicity was observed in animals exposed to Clethodim Technical.

Potentially Aggravated Medical Conditions: Individuals with preexisting diseases of the liver, red blood cell or central nervous system may have increased susceptability 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.

4. FIRST AID MEASURES

EMERGENCY NUMBER (800) 892-0099

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact **1-800-892-0099** for emergency medical treatment information.

EYE CONTACT:
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.

SKIN CONTACT:
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.

INGESTION:
Immediately call a poison control center or doctor. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give any liquid to the person. Do not give anything by mouth to an unconscious person.

INHALATION:
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.

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.

5. FIRE FIGHTING MEASURES

FLASH POINT:	162° F (72° C)
FLASH POINT METHOD:	SetaFlash Closed Cup
AUTOIGNITION:	No data available

EXTINGUISHING MEDIA: Water fog, carbon dioxide, foam, dry chemical

FLAMMABLE LIMITS IN AIR - LOWER (%): No data available
FLAMMABLE LIMITS IN AIR - UPPER (%): No data available

NFPA RATING:

Health:	1
Flammability:	2
Reactivity:	0
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 degrees 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. Oxides of sulfur. Combustion may produce toxic gases of: Toxic chlorine compounds. Incomplete combustion can produce carbon monoxide.

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 additional spill response information refer to the North American Emergency Response Guidebook.

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.

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

Do not store at temperatures below 32°F. If the product is exposed to temperatures below 32°F, thaw at room temperature to 50°F or warmer and shake gently to unify the product.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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

EYES: Do not get this material in your eyes. Eye contact can be avoided by wearing protective eyewear.

RESPIRATORY PROTECTION: Use this material only in well ventilated areas. Unless ventilation is adequate to keep airborne concentrations below recommended exposure standards, approved respiratory protection should be worn.

SKIN PROTECTION: Do not get on skin or clothing. Skin contact should be minimized by wearing protective clothing including coveralls worn over short-sleeved shirt and short pants, socks, chemical-resistant footwear and chemical-resistant gloves. Remove contaminated clothing. Discard clothing and other absorbent materials that may have been drenched or heavily contaminated with this product's concentrate. Do not reuse them.

EXPOSURE LIMITS - See Section 2.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE:	Liquid
COLOR:	Clear amber
ODOR:	Mild aromatic
DENSITY:	7.69 lbs/gal (0.921 g/mL) @ 20° C
VAPOR PRESSURE:	Not applicable
pH:	4.5 @ 25° C (1% emulsion)
VISCOSITY:	4.76 cP @ 20° C; 3.15 cP @ 40° C
SOLUBILITY:	Emulsifiable in water

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY:	Unstable at extreme pH's, temperature and upon exposure to UV light.
INCOMPATABILITY:	May react with strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
OXIDATION/REDUCTION PROPERTIES:	Not reactive with water, monoammonium phosphate, zinc, and potassium permanganate.
EXPLODABILITY:	Not expected to be explosive.

11. TOXICOLOGICAL INFORMATION

ACUTE (Product Specific Information):

Eye Irritation:	This product produced moderate eye irritation in the eyes of test animals. (Toxicity Category III)
Skin Irritation:	This product produced moderate skin irritation in animals. (Toxicity Category III)
Oral Toxicity:	The oral LD_{50} in rats is > 5000 mg/kg. (Toxicity Category IV)
Dermal Toxicity:	The dermal LD_{50} in rabbits is > 5000 mg/kg. (Toxicity Category IV)
Inhalation Toxicity:	The 4-hour inhalation LC_{50} is > 2.11 mg/L. (Toxicity Category IV)
Skin Sensitization:	This product was a skin sensitizer in animals.

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.

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. 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 amoung 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. A National Toxicology Program (NTP) report states that lifetime inhalation exposure to naphthalene resulted in increases in tumors of the nose in rats. In another NTP study, lifetime inhalation exposure to naphthalene increased lung tumors in female mice. The relevance of the rodent findings to humans is unknown. Naphthalene has been listed by the International Agency for Research on Cancer (IARC) as possibly carcinogenic to humans (Group 2B).

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.

12. ECOLOGICAL INFORMATION

AVIAN TOXICITY: The acute toxicity of Clethodim Technical to birds is very low:

Bobwhite quail oral LD_{50}: greater than 2 g/kg;
Bobwhite quail dietary LC_{50}: greater than 6000 ppm;
Mallard duck dietary LC_{50}: 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 LC_{50} = 67 mg/l;
Bluegill Sunfish 96-hour LC_{50} = 120 mg/l;
Daphnia magna 48-hour LC_{50}: 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.

13. DISPOSAL CONSIDERATIONS

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

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

14. TRANSPORT INFORMATION

DOT (ground) SHIPPING NAME:	Compounds, weed killing, liquid, non-regulated
DOT TECHNICAL SHIPPING NAME:	Clethodim 13% Solution
DOT REPORTABLE QUANTITY (RQ):	277 gallons (Naphthalene RQ=100 lb)
UN/NA NUMBER:	Not applicable
HAZARD CLASS:	Not applicable
REMARKS:	Regulated when shipped in bulk (>119 gal.)
EXEMPTION REQUIREMENT:	49 CFR 173.150

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:

Chemical Name	RCRA - U Series Wastes	Clean Water Act - Hazardous Substances	Clean Water Act Section 307
Clethodim ((E)-2-[1-[[(3-chloro-2-propenyl)oxy]imino]propyl]-5-[2-(ethylthio)propyl]-3-hydroxy-2-2cyclohenen-1-one) * (99129-21-2)	None	Not listed	Not listed
Total hydrocarbons (64742-94-5)	None	Not listed	Not listed
Naphthalene (91-20-3)	Listed	Listed	Listed

CWA Section 311: 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.

Chemical Name	SARA 313 Chemicals	SARA Section 302	CERCLA Reportable Quantity (RQ):
Clethodim ((E)-2-[1-[[(3-chloro-2-propenyl)oxy]imino]propyl]-5-[2-(ethylthio)propyl]-3-hydroxy-2-2cyclohenen-1-one) * (99129-21-2)	Not listed	Not listed	None
Total hydrocarbons (64742-94-5)	Not listed	Not listed	None
Naphthalene (91-20-3)	0.1% de minimis concentration	Not listed	100 lb (45.4 kg)

Product Reportable Quantity (RQ): 277 gallons

SARA (311, 312):

Immediate Health: Yes
Chronic Health: Yes
Fire: Yes
Sudden Pressure: No
Reactivity: No

Chemical Name	IARC - Group 1 (carcinogenic to humans)	IARC - Group 2A (Probably carcinogenic)	IARC - Group 2B (Possibly carcinogenic)	NTP Carcinogen List
Clethodim ((E)-2-[1-[[(3-chloro-2-propenyl)oxy]imino]propyl]-5-[2-(ethylthio)propyl]-3-hydroxy-2-2cyclohenen-1-one) * (99129-21-2)	No	No	No	Not listed
Total hydrocarbons (64742-94-5)	No	No	No	Not listed
Naphthalene (91-20-3)	No	No	X	Suspect Carcinogen

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. The state regulations reviewed include: California Proposition 65, California Directors List of Hazardous Substances, Massachusetts Right to Know, Michigan Critical Materials List, New Jersey Right to Know, Pennsylvania Right to Know, Rhode Island Right to Know and the Minnesota Hazardous Substance list. For Washington State Right to Know, see Section 2 for Exposure Limit information. For Louisiana Right to Know refer to SARA information listed under U.S. Regulations above.

Chemical Name	California Proposition 65	California - Directors List of Hazardous Substances
Clethodim ((E)-2-[1-[[(3-chloro-2-propenyl)oxy]imino]propyl]-5-[2-(ethylthio)propyl]-3-hydroxy-2-2cyclohenen-1-one) * (99129-21-2)	Not listed	Not listed
Total hydrocarbons (64742-94-5)	Not listed	Not listed
Naphthalene (91-20-3)	carcinogen, initial date 4/19/02	Listed

Chemical Name	MI - Critical Materials List	MA Right To Know	NJ Right To Know
Clethodim ((E)-2-[1-[[(3-chloro-2-propenyl)oxy]imino]propyl]-5-[2-(ethylthio)propyl]-3-hydroxy-2-2cyclohenen-1-one) * (99129-21-2)	Not listed	Not listed	Listed
Total hydrocarbons (64742-94-5)	Not listed	Not listed	Not listed
Naphthalene (91-20-3)	Not listed	Listed	Listed

Chemical Name	PA Right To Know	RI Right To Know	MN Hazardous Substance
Clethodim ((E)-2-[1-[[(3-chloro-2-propenyl)oxy]imino]propyl]-5-[2-(ethylthio)propyl]-3-hydroxy-2-2cyclohenen-1-one) * (99129-21-2)	Not listed	Not listed	Not listed
Total hydrocarbons (64742-94-5)	Not listed	Not listed	Not listed
Naphthalene (91-20-3)	Listed	Listed	Listed

California Proposition 65: WARNING: This product contains a chemical known to the State of California to cause cancer.

CANADIAN REGULATIONS:

WHMIS Hazard Class: Not determined

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

16. OTHER INFORMATION

REASON FOR ISSUE: Revised Sections: 3 and 11. Correct the first aid statement for ingestion of petroleum distillates.
MSDS NO.: 0320
REVISION NUMBER: 2
REVISION DATE: 09/08/2006
SUPERCEDES DATE: 09/01/2006

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 CORPORATON TO CONFIRM IF YOU HAVE THE MOST CURRENT MSDS.

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