Material Safety Data Sheet

Tenkoz, Inc.

Product Name: CROSSBOW* Herbicide

Issue Date: 05/12/2011
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Tenkoz, Inc. encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. Product and Company Identification

Product Name
CROSSBOW* Herbicide

COMPANY IDENTIFICATION
Tenkoz, Inc.
1725 Windward Concourse, Ste 410
Alpharetta, GA 30005
USA

EMERGENCY TELEPHONE NUMBER

24-Hour Emergency Contact: 800-992-5994

2. Hazards Identification

Emergency Overview

Color: Red to brown
Physical State: Liquid.
Odor: Sweet
Hazards of product:

DANGER! Combustible liquid and vapor. May cause allergic skin reaction. May cause eye irritation. May cause skin irritation. May cause respiratory tract irritation. Harmful or fatal if swallowed; can enter lungs and cause damage. Isolate area. Keep upwind of spill. Toxic fumes may be released in fire situations.

OSHA Hazard Communication Standard

This product is a “Hazardous Chemical” as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Potential Health Effects

Eye Contact: May cause moderate eye irritation. Corneal injury is unlikely.
Skin Contact: Brief contact is essentially nonirritating to skin. Prolonged contact may cause moderate skin irritation with local redness. May cause drying and flaking of the skin.

Skin Absorption: Prolonged skin contact is unlikely to result in absorption of harmful amounts. Observations in animals include: Lethargy.
Skin Sensitization: Skin contact may cause an allergic skin reaction.
Inhalation: Prolonged excessive exposure to mist may cause adverse effects. Excessive exposure may cause irritation to upper respiratory tract (nose and throat) and lungs. Observations in animals include: Lethargy.
Ingestion: Low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury. Observations in animals include: Lethargy. In humans, symptoms may include: Abdominal discomfort. May cause central nervous system depression. Diarrhea.
Aspiration hazard: Aspiration into the lungs may occur during ingestion or vomiting, causing lung damage or even death due to chemical pneumonia.
Effects of Repeated Exposure: For the active ingredient(s): In animals, effects have been reported on the following organs: Kidney. Liver. Eye. Thyroid. For kerosene: In animals, effects have been reported on the following organs after exposure to aerosols: Central nervous system. Respiratory tract. Observations in animals include: Anesthetic or narcotic effects. Contains component(s) which have been reported to cause effects on the following organs in animals: Blood. Spleen.
Cancer Information: For the solvent(s): In a lifetime animal dermal carcinogenicity study, an increased incidence of skin tumors was observed when kerosene was applied at doses that also produced skin irritation. This response was similar to that produced in skin by other types of chronic chemical/physical irritation. No increase in tumors was observed when non-irritating dilutions of kerosene were applied at equivalent doses, indicating that kerosene is unlikely to cause skin cancer in the absence of long-term continued skin irritation.
Birth Defects/Developmental Effects: For the active ingredient(s): Has been toxic to the fetus in laboratory animals at doses toxic to the mother. For the minor component(s): 2-Ethylhexanol Has caused birth defects in laboratory animals only at doses toxic to the mother. Has been toxic to the fetus in laboratory animals at doses toxic to the mother. These concentrations exceed relevant human dose levels.
Reproductive Effects: For similar active ingredient(s). 2,4-Dichlorophenoxyacetic acid. In laboratory animals, excessive doses toxic to the parent animals caused decreased weight and survival of offspring. For similar active ingredient(s). Triclopyr. In laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals.

3. Composition Information

Component	CAS #	Amount
2,4-Dichlorophenoxyacetic acid, butoxyethyl ester	1929-73-3	34.4 %
Triclopyr-2-butoxyethyl ester	64700-56-7	16.5 %
Kerosene (petroleum)	8008-20-6	41.5 %
2-Ethylhexanol	104-76-7	1.9 %
Balance		5.7 %

4. First-aid measures

Description of first aid measures

General advice: First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.
Inhalation: Move person to fresh air. If person is not breathing, call an emergency responder or ambulance, then give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask etc). Call a poison control center or doctor for treatment advice. If breathing is difficult, oxygen should be administered by qualified personnel.
Skin Contact: Take off contaminated clothing. Wash skin with soap and plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice. Wash clothing before reuse. Shoes and other leather items which cannot be decontaminated should be disposed of properly. Suitable emergency safety shower facility should be available in work area.

Eye Contact: Hold eyes 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 eyes. Call a poison control center or doctor for treatment advice. Suitable emergency eye wash facility should be available in work area.
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.

Most important symptoms and effects, both acute and delayed

Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), no additional symptoms and effects are anticipated.

Indication of immediate medical attention and special treatment needed

Maintain adequate ventilation and oxygenation of the patient. May cause asthma-like (reactive airways) symptoms. Bronchodilators, expectorants, antitussives and corticosteroids may be of help. The decision of whether to induce vomiting or not should be made by a physician. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. Exposure to this material may impair the ability to operate hazardous equipment or drive vehicles. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. Have the Safety Data Sheet, and if available, the product container or label with you when calling a poison control center or doctor, or going for treatment.
Skin contact may aggravate preexisting dermatitis. Repeated excessive exposure may aggravate preexisting lung disease.

5. Fire Fighting Measures

Suitable extinguishing media

Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

Special hazards arising from the substance or mixture

Hazardous Combustion Products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Nitrogen oxides. Hydrogen chloride. Carbon monoxide. Carbon dioxide. Combustion products may include trace amounts of: Phosgene.
Unusual Fire and Explosion Hazards: Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Dense smoke is produced when product burns.

Advice for firefighters

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Consider feasibility of a controlled burn to minimize environment damage. Foam fire extinguishing system is preferred because uncontrolled water can spread possible contamination. Burning liquids may be extinguished by dilution with water. Do not use direct water stream. May spread fire. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. Contain fire water run-off if possible. Fire water run-off, if not contained, may cause environmental damage. Review the “Accidental Release Measures” and the “Ecological Information” sections of this (M)SDS.
Special Protective Equipment for Firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures: Isolate area. Keep unnecessary and unprotected personnel from entering the area. Refer to Section 7, Handling, for additional precautionary measures. Keep upwind of spill. Ventilate area of leak or spill. No smoking in area. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

Environmental precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.
Methods and materials for containment and cleaning up: Contain spilled material if possible. Small spills: Absorb with materials such as: Clay. Dirt. Sand. Sweep up. Collect in suitable and properly labeled containers. Large spills: Contact Dow AgroSciences for clean-up assistance. See Section 13, Disposal Considerations, for additional information.

7. Handling and Storage

Handling
General Handling: Keep out of reach of children. Keep away from heat, sparks and flame. Containers, even those that have been emptied, can contain vapors. Do not cut, drill, grind, weld, or perform similar operations on or near empty containers. Avoid contact with eyes, skin, and clothing. Do not swallow. Avoid breathing vapor or mist. Wash thoroughly after handling. Keep container closed. Use with adequate ventilation. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Storage
Store in a dry place. Store in original container. Keep container tightly closed when not in use. Do not store near food, foodstuffs, drugs or potable water supplies.

8. Exposure Controls / Personal Protection

Exposure Limits

Component	List	Type	Value
Kerosene (petroleum)	Dow IHG	TWA as total hydrocarbon vapor	10 mg/m3 SKIN
	ACGIH	TWA Non-aerosol. as total hydrocarbon vapor	200 mg/m3 P: Application restricted to conditions in which there are negligible aerosol exposures.
2,4-Dichlorophenoxyacetic acid, butoxyethyl ester	ACGIH	TWA	10 mg/m3
	OSHA Table Z-1	PEL	10 mg/m3
Triclopyr-2-butoxyethyl ester	Dow IHG	TWA	2 mg/m3 D-SEN

RECOMMENDATIONS IN THIS SECTION ARE FOR MANUFACTURING, COMMERCIAL BLENDING AND PACKAGING WORKERS. APPLICATORS AND HANDLERS SHOULD SEE THE PRODUCT LABEL FOR PROPER PERSONAL PROTECTIVE EQUIPMENT AND CLOTHING.
A “skin” notation following the inhalation exposure guideline refers to the potential for dermal absorption of the material including mucous membranes and the eyes either by contact with vapors or by direct skin contact.

It is intended to alert the reader that inhalation may not be the only route of exposure and that measures to minimize dermal exposures should be considered.
A D-SEN notation following the exposure guideline refers to the potential to produce dermal sensitization, as confirmed by human or animal data.

Personal Protection

Eye/Face Protection: Use chemical goggles.
Skin Protection: Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task.

Hand protection: Use gloves chemically resistant to this material. Examples of preferred glove barrier materials include: Chlorinated polyethylene. Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Viton. Examples of acceptable glove barrier materials include: Butyl rubber. Natural rubber ("latex"). Polyvinyl chloride ("PVC" or "vinyl"). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Respiratory Protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. In misty atmospheres, use an approved particulate respirator. The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.
Ingestion: Avoid ingestion of even very small amounts; do not consume or store food or tobacco in the work area; wash hands and face before smoking or eating.

Engineering Controls

Ventilation: Use engineering controls to maintain airborne level below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations.

9. Physical and Chemical Properties

Appearance	
Physical State	Liquid.
Color	Red to brown
Odor	Sweet
Odor Threshold	No test data available
pH	3.8 (@ 10 %) *pH Electrode* (10% solution in water)
Melting Point	Not applicable
Freezing Point	No test data available
Boiling Point (760 mmHg)	> 175 °C (> 347 °F) (kerosene).
Flash Point - Closed Cup	64 °C (147 °F) *Closed Cup*
Evaporation Rate (Butyl Acetate = 1)	No test data available
Flammable Limits In Air	**Lower**: No test data available **Upper**: No test data available
Vapor Pressure	0.1 mmHg @ 37.8 °C (kerosene)
Vapor Density (air = 1)	4.7 (kerosene)
Specific Gravity (H2O = 1)	
Solubility in water (by weight)	emulsifiable
Partition coefficient, n-octanol/water (log Pow)	No data available for this product. See Section 12 for individual component data.
Autoignition Temperature	No test data available
Decomposition Temperature	No test data available
Dynamic Viscosity	6.56 mPa.s @ 25 °C
Liquid Density	1.0114 g/cm3 @ 20 °C *Digital density meter*

10. Stability and Reactivity

Reactivity
No dangerous reaction known under conditions of normal use.

Chemical stability
Thermally stable at typical use temperatures.

Possibility of hazardous reactions
Polymerization will not occur.

Conditions to Avoid: Some components of this product can decompose at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems.

Incompatible Materials: Avoid contact with: Acids. Bases. Oxidizers.

Hazardous decomposition products
Decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to: Hydrogen chloride. Nitrogen oxides. Toxic gases are released during decomposition. Decomposition products can include trace amounts of: Phosgene.

11. Toxicological Information

Acute Toxicity
Ingestion
Estimated. LD50, Rat, male and female 1,000 mg/kg
Dermal
As product: LD50, Rabbit, male and female > 5,000 mg/kg
Inhalation
As product: LC50, 4 h, Aerosol, Rat, male and female > 5.19 mg/l

Eye damage/eye irritation
May cause moderate eye irritation. Corneal injury is unlikely.

Skin corrosion/irritation
Brief contact is essentially nonirritating to skin. Prolonged contact may cause moderate skin irritation with local redness. May cause drying and flaking of the skin.

Sensitization
Skin
Skin contact may cause an allergic skin reaction.
Respiratory
No relevant data found.

Repeated Dose Toxicity
For the active ingredient(s): In animals, effects have been reported on the following organs: Kidney. Liver. Eye. Thyroid. For kerosene: In animals, effects have been reported on the following organs after exposure to aerosols: Central nervous system. Respiratory tract. Observations in animals include: Anesthetic or narcotic effects. Contains component(s) which have been reported to cause effects on the following organs in animals: Blood. Spleen.

Chronic Toxicity and Carcinogenicity
For similar active ingredient(s). Various animal cancer tests have shown no reliably positive association between 2,4-D exposure and cancer. Epidemiology studies on herbicide use have been both positive and negative with the majority being negative. For similar active ingredient(s). Triclopyr. Did not cause cancer in laboratory animals. For the solvent(s): In a lifetime animal dermal carcinogenicity study, an increased incidence of skin tumors was observed when kerosene was applied at doses that also produced skin irritation. This response was similar to that produced in skin by other types of chronic chemical/physical irritation. No increase in tumors was observed when non-irritating dilutions of kerosene were applied at equivalent doses, indicating that kerosene is unlikely to cause skin cancer in the absence of long-term continued skin irritation.

Carcinogenicity Classifications:

Component	List	Classification
Kerosene (petroleum)	ACGIH	Confirmed animal carcinogen with

unknown relevance to humans.; Group A3

Developmental Toxicity

For the active ingredient(s): Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Did not cause birth defects in laboratory animals. For the minor component(s): 2-Ethylhexanol Has caused birth defects in laboratory animals only at doses toxic to the mother. Has been toxic to the fetus in laboratory animals at doses toxic to the mother. These concentrations exceed relevant human dose levels.

Reproductive Toxicity

For similar active ingredient(s). 2,4-Dichlorophenoxyacetic acid. In laboratory animals, excessive doses toxic to the parent animals caused decreased weight and survival of offspring. For similar active ingredient(s). Triclopyr. In laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals.

Genetic Toxicology

For the active ingredient(s): In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

12. Ecological Information

Toxicity

Data for Component: **2,4-Dichlorophenoxyacetic acid, butoxyethyl ester**

Material is highly toxic to aquatic organisms on an acute basis (LC50/EC50 between 0.1 and 1 mg/L in the most sensitive species tested). Material is practically non-toxic to birds on an acute basis (LD50 > 2000 mg/kg). Material is practically non-toxic to birds on a dietary basis (LC50 > 5000 ppm).

Fish Acute & Prolonged Toxicity
LC50, bluegill (Lepomis macrochirus), static, 96 h: 0.61 mg/l
Aquatic Invertebrate Acute Toxicity
LC50, water flea Daphnia magna, static, 48 h, survival: 7.2 - 33 mg/l
Aquatic Plant Toxicity
EbC50, green alga Pseudokirchneriella subcapitata (formerly known as Selenastrum capricornutum), static, biomass growth inhibition, 5 d: 25 mg/l
EbC50, duckweed Lemna sp., static, biomass growth inhibition, 5 d: 0.576 mg/l
Toxicity to Above Ground Organisms
dietary LC50, bobwhite (Colinus virginianus): > 5620 mg/kg diet.
oral LD50, bobwhite (Colinus virginianus): > 2000 mg/kg bodyweight.

Data for Component: **Triclopyr-2-butoxyethyl ester**

Material is highly toxic to aquatic organisms on an acute basis (LC50/EC50 between 0.1 and 1 mg/L in the most sensitive species tested). Material is slightly toxic to birds on an acute basis (LD50 between 501 and 2000 mg/kg). Material is practically non-toxic to birds on a dietary basis (LC50 > 5000 ppm).

Fish Acute & Prolonged Toxicity
LC50, bluegill (Lepomis macrochirus), flow-through, 96 h: 0.36 mg/l
Aquatic Invertebrate Acute Toxicity
EC50, water flea Daphnia magna, 48 h, immobilization: 6.8 mg/l
Aquatic Plant Toxicity
EbC50, diatom Navicula sp., biomass growth inhibition, 120 h: 0.193 mg/l
Aquatic Invertebrates Chronic Toxicity Value
water flea Daphnia magna, 21 d, number of offspring, NOEC: 1.6 mg/l, LOEC: 5.1 mg/l
Toxicity to Above Ground Organisms
oral LD50, bobwhite (Colinus virginianus): 735 mg/kg
dietary LC50, bobwhite (Colinus virginianus): 5,401 ppm
oral LD50, Honey bee (Apis mellifera): > 100 micrograms/bee
contact LD50, Honey bee (Apis mellifera): > 100 micrograms/bee
Toxicity to Soil Dwelling Organisms
LC50, Earthworm Eisenia foetida, adult, 14 d: > 1,042 mg/kg

Data for Component: **Kerosene (petroleum)**

Based on information for component(s): Material is slightly toxic to fish on an acute basis (LC50 between 10 and 100 mg/L).

Fish Acute & Prolonged Toxicity
LC50, fathead minnow (Pimephales promelas), static, 96 h: 42.7 mg/l

Data for Component: **2-Ethylhexanol**

Material is slightly toxic to aquatic organisms on an acute basis (LC50/EC50 between 10 and 100 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity
LC50, rainbow trout (Oncorhynchus mykiss), 96 h: 32 - 37 mg/l
Aquatic Invertebrate Acute Toxicity
LC50, water flea Daphnia magna, 48 h, lethality: 35.2 mg/l
Aquatic Plant Toxicity
EC50, green alga Pseudokirchneriella subcapitata (formerly known as Selenastrum capricornutum), Growth rate inhibition, 72 h: 11.5 mg/l
Toxicity to Micro-organisms
EC50; bacteria, 16 h: 256 - 320 mg/l

Persistence and Degradability

Data for Component: **2,4-Dichlorophenoxyacetic acid, butoxyethyl ester**

Chemical degradation (hydrolysis) is expected in the environment. For similar active ingredient(s). Material is expected to be readily biodegradable.

Data for Component: **Triclopyr-2-butoxyethyl ester**

Chemical degradation (hydrolysis) is expected in the environment. Material is expected to biodegrade only very slowly (in the environment). Fails to pass OECD/EEC tests for ready biodegradability.

Stability in Water (1/2-life):
12 h; 25 °C; pH 6.7

OECD Biodegradation Tests:

Biodegradation	Exposure Time	Method	10 Day Window
18 %	28 d	OECD 301B Test	pass

Theoretical Oxygen Demand: 1.39 mg/mg

Data for Component: **Kerosene (petroleum)**

Biodegradation under aerobic static laboratory conditions is high (BOD20 or BOD28/ThOD > 40%).

Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
1.393E-11 cm3/s	0.767 d	Estimated.

Biological oxygen demand (BOD):

BOD 5	BOD 10	BOD 20	BOD 28
31.000 %	39.700 %	58.600 %	

Chemical Oxygen Demand: 1.16 mg/mg

Data for Component: **2-Ethylhexanol**

Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Material is ultimately biodegradable (reaches > 70% mineralization in OECD test(s) for inherent biodegradability).

OECD Biodegradation Tests:

Biodegradation	Exposure Time	Method	10 Day Window
68 %	17 d	OECD 301B Test	pass
> 95 %	5 d	OECD 302B Test	Not applicable

Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
1.32E-11 cm3/s	9.7 h	Estimated.

Biological oxygen demand (BOD):

BOD 5	BOD 10	BOD 20	BOD 28
26 - 70 %	75 - 81 %	86 - 87 %	

Chemical Oxygen Demand: 2.70 mg/mg
Theoretical Oxygen Demand: 2.95 mg/mg

Bioaccumulative potential

Data for Component: **2,4-Dichlorophenoxyacetic acid, butoxyethyl ester**
Bioaccumulation: Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).
Partition coefficient, n-octanol/water (log Pow): 4.35 Measured
Data for Component: **Triclopyr-2-butoxyethyl ester**
Bioaccumulation: Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).
Partition coefficient, n-octanol/water (log Pow): 4.09 - 4.49 Measured
Data for Component: **Kerosene (petroleum)**
Partition coefficient, n-octanol/water (log Pow): 6.1 Measured
Bioconcentration Factor (BCF): 314; fish; Estimated.
61 - 159; fish
Data for Component: **2-Ethylhexanol**
Bioaccumulation: Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).
Partition coefficient, n-octanol/water (log Pow): 3.1 Measured

Mobility in soil

Data for Component: **2,4-Dichlorophenoxyacetic acid, butoxyethyl ester**
Mobility in soil: No relevant data found.
Data for Component: **Triclopyr-2-butoxyethyl ester**
Mobility in soil: No relevant data found.
Data for Component: **Kerosene (petroleum)**
Partition coefficient, soil organic carbon/water (Koc): 5,900 Estimated.
Henry's Law Constant (H): 8.24E+00 atm*m3/mole; 25 °C Measured
Data for Component: **2-Ethylhexanol**
Mobility in soil: Potential for mobility in soil is low (Koc between 500 and 2000).
Partition coefficient, soil organic carbon/water (Koc): 800 Estimated.
Henry's Law Constant (H): 2.49E-05 atm*m3/mole Estimated.

13. Disposal Considerations

If wastes and/or containers cannot be disposed of according to the product label directions, disposal of this material must be in accordance with your local or area regulatory authorities. This 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. If the material as supplied becomes a waste, follow all applicable regional, national and local laws.

14. Transport Information

DOT Non-Bulk
Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
Technical Name: KEROSENE, 2,4-D ESTER
Hazard Class: 9 **ID Number:** UN3082 **Packing Group:** PG III

DOT Bulk
Proper Shipping Name: COMBUSTIBLE LIQUID, N.O.S.

Technical Name: KEROSENE, 2,4-D ESTER
Hazard Class: COMBUSTIBLE LIQUID **ID Number:** NA1993 **Packing Group:** PG III

IMDG
Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S
Technical Name: KEROSENE, 2,4-D ESTER
Hazard Class: 9 **ID Number:** UN3082 **Packing Group:** PG III
EMS Number: F-A,S-F
Marine pollutant.: Yes

ICAO/IATA
Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
Technical Name: KEROSENE, 2,4-D ESTER
Hazard Class: 9 **ID Number:** UN3082 **Packing Group:** PG III
Cargo Packing Instruction: 964
Passenger Packing Instruction: 964
Additional Information

Reportable quantity: 291 lb – 2,4-D ESTER

MARINE POLLUTANT

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. Regulatory Information

OSHA Hazard Communication Standard
This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312

Immediate (Acute) Health Hazard	Yes
Delayed (Chronic) Health Hazard	Yes
Fire Hazard	Yes
Reactive Hazard	No
Sudden Release of Pressure Hazard	No

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313
This product contains the following substances which are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and which are listed in 40 CFR 372.

Component	CAS #	Amount
2,4-Dichlorophenoxyacetic acid, butoxyethyl ester	1929-73-3	34.4%
Naphthalene	91-20-3	0.2%

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Hazardous Substances List and/or Pennsylvania Environmental Hazardous Substance List:
The following product components are cited in the Pennsylvania Hazardous Substance List and/or the Pennsylvania Environmental Substance List, and are present at levels which require reporting.

Component	CAS #	Amount
2,4-Dichlorophenoxyacetic acid, butoxyethyl ester	1929-73-3	34.4%
Kerosene (petroleum)	8008-20-6	41.5%

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Special Hazardous Substances List:
To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) Section 103
This product contains the following substances which are subject to CERCLA Section 103 reporting requirements and which are listed in 40 CFR 302.4.

Component	CAS #	Amount
2,4-Dichlorophenoxyacetic acid, butoxyethyl ester	1929-73-3	34.4%
Naphthalene	91-20-3	0.2%

California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986)
WARNING: This product contains a chemical(s) known to the State of California to cause cancer.

Toxic Substances Control Act (TSCA)
All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.30

16. Other Information

Hazard Rating System

NFPA	Health	Fire	Reactivity
	1	2	0

Revision

Identification Number: 50258 / 1016 / Issue Date 05/12/2011 / Version: 4.0
DAS Code: XRM-4715
Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

N/A	Not available
W/W	Weight/Weight
OEL	Occupational Exposure Limit
STEL	Short Term Exposure Limit
TWA	Time Weighted Average
ACGIH	American Conference of Governmental Industrial Hygienists, Inc.
DOW IHG	Dow Industrial Hygiene Guideline
WEEL	Workplace Environmental Exposure Level
HAZ_DES	Hazard Designation
Action Level	A value set by OSHA that is lower than the PEL which will trigger the need for activities such as exposure monitoring and medical surveillance if exceeded.

Tenkoz, Inc. urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to

the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.