Dow AgroSciences LLC 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
LORSBAN* 4E Insecticide

COMPANY IDENTIFICATION
Dow AgroSciences LLC
A Subsidiary of The Dow Chemical Company
9330 Zionsville Road
Indianapolis, IN 46268-1189
USA

Customer Information Number: 800-992-5994
SDSQuestion@dow.com

EMERGENCY TELEPHONE NUMBER

24-Hour Emergency Contact: 800-992-5994
Local Emergency Contact: 352-323-3500

2. Hazards Identification

Emergency Overview
Color: Red
Physical State: Liquid.
Odor: Aromatic
Hazards of product:

WARNING! Combustible liquid and vapor. Harmful if swallowed. May cause eye irritation. May cause skin irritation. May be harmful if absorbed through skin. May be harmful if inhaled. May cause central nervous system effects; may cause respiratory tract irritation. Vapor explosion hazard. Vapors may travel a long distance; ignition and/or flash back may occur. Keep upwind of spill. Stay out of low areas. Toxic fumes may be released in fire situations. Avoid temperatures above 70°C (158°F)

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. Vapor may cause eye irritation experienced as mild discomfort and redness.
Skin Contact: Brief contact may cause slight skin irritation with local redness. Prolonged contact may cause moderate skin irritation with local redness. May cause drying and flaking of the skin.
Skin Absorption: Prolonged or widespread skin contact may result in absorption of potentially harmful amounts.
Inhalation: Prolonged excessive exposure to mist may cause serious adverse effects, even death. Vapor concentrations are attainable which could be hazardous on single exposure. Symptoms may include headache, dizziness and drowsiness, progressing to incoordination and unconsciousness. May cause respiratory irritation and central nervous system depression. Observations in animals include: Tremors. Excessive exposure may produce organophosphate type cholinesterase inhibition.
Ingestion: Moderate 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 serious injury, even death. Observations in animals include: Tremors.
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): Excessive exposure may produce organophosphate type cholinesterase inhibition. Signs and symptoms of excessive exposure to active ingredient may be headache, dizziness, incoordination, muscle twitching, tremors, nausea, abdominal cramps, diarrhea, sweating, pinpoint pupils, blurred vision, salivation, tearing, tightness in chest, excessive urination, convulsions. In animals, effects have been reported on the following organs: Adrenal gland. Dose levels producing these effects were many times higher than any dose levels expected from exposure due to use. Solvent has been reported to cause liver, kidney and blood effects at high exposure levels. For the major component(s): In animals, effects have been reported on the following organs: Respiratory tract. Cataracts were observed in rats exposed to cumene vapors.
Cancer Information: For the minor component(s) Cumene. Has caused cancer in laboratory animals. However, the relevance of this to humans is unknown.
Birth Defects/Developmental Effects: For the active ingredient(s): Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Based on information for component(s): Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Has caused birth defects in laboratory animals only at doses toxic to the mother.
Reproductive Effects: Chlorpyrifos did not interfere with fertility in reproduction studies in laboratory animals. Some evidence of toxicity to the offspring occurred, but only at a dose high enough to produce significant toxicity to the parent animals. For the solvent(s): 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
Chlorpyrifos	2921-88-2	44.9 %
1,2,4-Trimethylbenzene	95-63-6	14.4 %
1,3,5-Trimethylbenzene	108-67-8	3.8 %
Cumene	98-82-8	1.9 %
2-Ethylhexanol	104-76-7	1.0 %
Xylene	1330-20-7	0.4 %
Balance	Not available	33.6 %

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

Chlorpyrifos is a cholinesterase inhibitor. Treat symptomatically. In case of severe acute poisoning, use antidote immediately after establishing an open airway and respiration. Atropine, only by injection, is the preferable antidote. Oximes, such as 2-PAM/protopam, may be therapeutic if used early; however, use only in conjunction with atropine. Maintain adequate ventilation and oxygenation of the patient. Attempt seizure control with diazepam 5-10 mg (adults) intravenous over 2-3 minutes. Repeat every 5-10 minutes as needed. Monitor for hypotension, respiratory depression, and need for intubation. Consider second agent if seizures persist after 30 mg. If seizures persist or recur administer phenobarbital 600-1200 mg (adults) intravenous diluted in 60 ml 0.9% saline given at 25-50 mg/minute. Evaluate for hypoxia, dysrhythmia, electrolyte disturbance, hypoglycemia (treat adults with dextrose 100 mg intravenous). If exposed, plasma and red blood cell cholinesterase tests may indicate significance of exposure (baseline data are useful). 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. 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.

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: Sulfur oxides. Phosphorous compounds. Nitrogen oxides. Hydrogen chloride. Carbon monoxide. Carbon dioxide.
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. When product is stored in closed containers, a flammable atmosphere can develop. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Dense smoke is produced when product burns.

Advice for firefighters

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Stay upwind. Keep out of low areas where gases (fumes) can accumulate. Consider feasibility of a controlled burn to minimize environment damage. Foam fire extinguishing system is preferred because uncontrolled water can spread possible contamination. Use water spray to cool fire exposed

containers and fire affected zone until fire is out and danger of reignition has passed. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Burning liquids may be extinguished by dilution with water. Do not use direct water stream. May spread fire. Eliminate ignition sources. Move container from fire area if this is possible without hazard. 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). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures: No smoking in area. Vapor explosion hazard. Keep out of sewers. Eliminate all sources of ignition in vicinity of spill or released vapor to avoid fire or explosion. Isolate area. Keep unnecessary and unprotected personnel from entering the area. Keep upwind of spill. Keep personnel out of low areas. Ventilate area of leak or spill. Refer to Section 7, Handling, for additional precautionary measures. 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: Pump with explosion-proof equipment. If available, use foam to smother or suppress. 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. No smoking, open flames or sources of ignition in handling and storage area. Electrically ground and bond all equipment. Use of non-sparking or explosion-proof equipment may be necessary, depending upon the type of operation. 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. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Do not swallow. Avoid breathing vapor or mist. Avoid contact with eyes, skin, and clothing. 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. Avoid temperatures above 70°C (158°F) Minimize sources of ignition, such as static build-up, heat, spark or flame.

8. Exposure Controls / Personal Protection

Exposure Limits

Component	List	Type	Value

Chlorpyrifos	ACGIH	TWA Inhalable fraction and vapor.	0.1 mg/m3 SKIN, BEI
1,2,4-Trimethylbenzene	ACGIH	TWA	25 ppm
1,3,5-Trimethylbenzene	ACGIH	TWA	25 ppm
Cumene	ACGIH OSHA Table Z-1	TWA PEL	50 ppm 245 mg/m3 50 ppm SKIN
Xylene	ACGIH ACGIH OSHA Table Z-1	TWA STEL PEL	100 ppm BEI 150 ppm BEI 435 mg/m3 100 ppm

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 BEI notation following the exposure guideline refers to a guidance value for assessing biological monitoring results as an indicator of the uptake of a substance from all routes of exposures.
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.

Personal Protection

Eye/Face Protection: Use chemical goggles. If exposure causes eye discomfort, use a full-face respirator.
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"). Examples of acceptable glove barrier materials include: Butyl rubber. Natural rubber ("latex"). Polyvinyl chloride ("PVC" or "vinyl"). Viton. 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, use an approved respirator. Selection of air-purifying or positive-pressure supplied-air will depend on the specific operation and the potential airborne concentration of the material. For emergency conditions, use an approved positive-pressure self-contained breathing apparatus. In confined or poorly ventilated areas, use an approved self-contained breathing apparatus or positive pressure air line with auxiliary self-contained air supply. 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
Odor	Aromatic
pH	4.3 *pH Electrode*
Melting Point	Not applicable
Freezing Point	No test data available
Boiling Point (760 mmHg)	143 °C (289 °F) *Literature* (solvent).
Flash Point - Closed Cup	41 °C (106 °F) *Tag Closed Cup ASTM D56*
Evaporation Rate (Butyl Acetate = 1)	No test data available
Flammable Limits In Air	**Lower**: 1 %(V) **Upper**: 6 %(V) *Literature* (xylene range aromatic solvent)
Vapor Pressure	No test data available
Vapor Density (air = 1)	No test data available
Specific Gravity (H2O = 1)	1.074 *Digital Density Meter (Oscillating Coil)*
Solubility in water (by weight)	*Literature* 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	
Dynamic Viscosity	3.2 mPa.s @ 20 °C
Kinematic Viscosity	No test data available
Liquid Density	1.074 g/cm3 @ 20 °C *Literature*

10. Stability and Reactivity

Reactivity
No dangerous reaction known under conditions of normal use.

Chemical stability
Unstable at elevated temperatures.

Possibility of hazardous reactions
Polymerization will not occur.

Conditions to Avoid: Avoid temperatures above 70°C (158°F) Active ingredient decomposes at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems.

Incompatible Materials: Avoid contact with oxidizing materials. Avoid contact with: Bases. Strong acids.

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. Organic sulfides. Sulfur dioxide. Toxic gases are released during decomposition.

11. Toxicological Information

Acute Toxicity
Ingestion
As product: Single dose oral LD50 has not been determined. Estimated. LD50, rat 300 mg/kg

Dermal
As product: The dermal LD50 has not been determined. Based on information for component(s): LD50, rabbit > 1,000 mg/kg

Inhalation
As product: The LC50 has not been determined. Estimated. LC50, 4 h, Aerosol, rat > 2 mg/l

Eye damage/eye irritation

May cause moderate eye irritation. Corneal injury is unlikely. Vapor may cause eye irritation experienced as mild discomfort and redness.

Skin corrosion/irritation

Brief contact may cause slight skin irritation with local redness. Prolonged contact may cause moderate skin irritation with local redness. May cause drying and flaking of the skin.

Sensitization

Skin

Based on information for component(s): Did not cause allergic skin reactions when tested in guinea pigs.

Respiratory

No relevant data found.

Repeated Dose Toxicity

For the active ingredient(s): Excessive exposure may produce organophosphate type cholinesterase inhibition. Signs and symptoms of excessive exposure to active ingredient may be headache, dizziness, incoordination, muscle twitching, tremors, nausea, abdominal cramps, diarrhea, sweating, pinpoint pupils, blurred vision, salivation, tearing, tightness in chest, excessive urination, convulsions. In animals, effects have been reported on the following organs: Adrenal gland. Dose levels producing these effects were many times higher than any dose levels expected from exposure due to use. Solvent has been reported to cause liver, kidney and blood effects at high exposure levels. For the major component(s): In animals, effects have been reported on the following organs: Respiratory tract. Cataracts were observed in rats exposed to cumene vapors.

Chronic Toxicity and Carcinogenicity

Active ingredient did not cause cancer in laboratory animals. For the minor component(s) Cumene. Has caused cancer in laboratory animals. However, the relevance of this to humans is unknown.

Developmental Toxicity

For the active ingredient(s): Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Active ingredient did not cause birth defects in laboratory animals. Based on information for component(s): Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Has caused birth defects in laboratory animals only at doses toxic to the mother.

Reproductive Toxicity

Chlorpyrifos did not interfere with fertility in reproduction studies in laboratory animals. Some evidence of toxicity to the offspring occurred, but only at a dose high enough to produce significant toxicity to the parent animals. For the solvent(s): In laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals.

Genetic Toxicology

Based on a majority of negative data and some equivocal or marginally positive results, active ingredient is considered to have minimal genetic toxicity potential. For the component(s) tested: In vitro genetic toxicity studies were negative. For the component(s) tested: Animal genetic toxicity studies were negative.

12. Ecological Information

Toxicity

Data for Component: **Chlorpyrifos**

Material is very highly toxic to aquatic organisms on an acute basis (LC50/EC50 <0.1 mg/L in the most sensitive species). Material is highly toxic to birds on a dietary basis (LC50 between 50 and 500 ppm).

Fish Acute & Prolonged Toxicity

LC50, rainbow trout (Oncorhynchus mykiss), 96 h: 0.0030 - 0.0085 mg/l

Aquatic Invertebrate Acute Toxicity

EC50, water flea Daphnia magna, 48 h: 0.00068 mg/l

Aquatic Plant Toxicity

EC50, alga Scenedesmus sp., biomass growth inhibition, 96 h: 0.48 mg/l

EC50, diatom Skeletonema costatum, Growth inhibition (cell density reduction), 96 h: 0.255 - 0.328 mg/l

ErC50, algae, 72 h: 1.2 mg/l

Toxicity to Micro-organisms

EC50; activated sludge: > 100 mg/l
Aquatic Invertebrates Chronic Toxicity Value
water flea Daphnia magna, number of offspring, NOEC: 0.000056 mg/l
Toxicity to Above Ground Organisms
oral LD50, Other: 122 mg/kg bodyweight.
dietary LC50, bobwhite (Colinus virginianus): 423 mg/kg diet.
oral LD50, Honey bee (Apis mellifera): 0.36 micrograms/bee
contact LD50, Honey bee (Apis mellifera): 0.070 micrograms/bee
Toxicity to Soil Dwelling Organisms
LC50, Earthworm Eisenia foetida, adult, 14 d: 209.9 mg/kg

Data for Component: **1,2,4-Trimethylbenzene**

Material is moderately toxic to aquatic organisms on an acute basis (LC50/EC50 between 1 and 10 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity
LC50, fathead minnow (Pimephales promelas), flow-through, 96 h: 7.7 mg/l
Aquatic Invertebrate Acute Toxicity
EC50, water flea Daphnia magna, 48 h: 3.6 mg/l

Data for Component: **1,3,5-Trimethylbenzene**

Material is moderately toxic to aquatic organisms on an acute basis (LC50/EC50 between 1 and 10 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity
LC50, goldfish (Carassius auratus), flow-through, 96 h: 12.5 mg/l
Aquatic Invertebrate Acute Toxicity
LC50, water flea Daphnia magna, static test, 48 h, mortality: 6 mg/l
Aquatic Plant Toxicity
EbC50, alga Scenedesmus sp., biomass growth inhibition, 48 h: 25 mg/l
Aquatic Invertebrates Chronic Toxicity Value
water flea Daphnia magna, static renewal, 21 d, number of offspring, NOEC: 0.4 mg/l

Data for Component: **Cumene**

Material is moderately toxic to aquatic organisms on an acute basis (LC50/EC50 between 1 and 10 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity
LC50, rainbow trout (Oncorhynchus mykiss), static renewal, 96 h: 2.7 mg/l
Aquatic Invertebrate Acute Toxicity
EC50, water flea Daphnia magna, static, 48 h, immobilization: 4.0 mg/l
Aquatic Plant Toxicity
EbC50, green alga Pseudokirchneriella subcapitata (formerly known as Selenastrum capricornutum), static, biomass growth inhibition, 72 h: 2.6 mg/l
Aquatic Invertebrates Chronic Toxicity Value
water flea Daphnia magna, static renewal, 21 d, number of offspring, NOEC: 0.35 mg/l, LOEC: 0.66 mg/l
Toxicity to Above Ground Organisms
oral LD50, redwing blackbird (Agelaius phoeniceus): > 98 mg/kg

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, Oncorhynchus mykiss (rainbow trout), 96 h: 32 - 37 mg/l
Aquatic Invertebrate Acute Toxicity
LC50, Daphnia magna (Water flea), 48 h, lethality: 35.2 mg/l
Aquatic Plant Toxicity
ErC50, Pseudokirchneriella subcapitata (green algae), Growth rate inhibition, 72 h: 11.5 mg/l
Toxicity to Micro-organisms
EC50; Bacteria, 16 h: 256 - 320 mg/l

Data for Component: **Xylene**

Material is moderately toxic to aquatic organisms on an acute basis (LC50/EC50 between 1 and 10 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity
LC50, rainbow trout (Oncorhynchus mykiss), 96 h: 9.2 mg/l
Aquatic Invertebrate Acute Toxicity
LC50, water flea Daphnia magna, 48 h, lethality: 14.3 mg/l
Aquatic Plant Toxicity
EbC50, green alga Pseudokirchneriella subcapitata (formerly known as Selenastrum capricornutum), biomass growth inhibition, 72 h: 3.2 - 4.9 mg/l

Persistence and Degradability

Data for Component: **Chlorpyrifos**

Biodegradation under aerobic laboratory conditions is below detectable limits (BOD20 or BOD28/ThOD < 2.5%).
Stability in Water (1/2-life):
7 - 14 d
Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
9.16678E-11 cm3/s	1.4 h	Estimated.

Biological oxygen demand (BOD):

BOD 5	BOD 10	BOD 20	BOD 28
0.000 %			

Data for Component: **1,2,4-Trimethylbenzene**

Material is expected to biodegrade only very slowly (in the environment). Fails to pass OECD/EEC tests for ready biodegradability.
OECD Biodegradation Tests:

Biodegradation	Exposure Time	Method	10 Day Window
4 - 18 %	28 d	OECD 301C Test	Not applicable

Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
1.670E-11 cm3/s	0.641 d	Estimated.

Theoretical Oxygen Demand: 3.19 mg/mg

Data for Component: **1,3,5-Trimethylbenzene**

Based on stringent OECD test guidelines, this material cannot be considered as readily biodegradable; however, these results do not necessarily mean that the material is not biodegradable under environmental conditions.
OECD Biodegradation Tests:

Biodegradation	Exposure Time	Method	10 Day Window
0 %	28 d	OECD 301C Test	Not applicable
50 %	4.4 d	Calculated	Not applicable

Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
3.51E-11 cm3/s	3.7 h	Estimated.

Theoretical Oxygen Demand: 3.19 mg/mg

Data for Component: **Cumene**

Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.
OECD Biodegradation Tests:

Biodegradation	Exposure Time	Method	10 Day Window
86 %	28 d	OECD 301D Test	pass

Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
6.90E-12 cm3/s	1.55 d	Estimated.

Biological oxygen demand (BOD):

BOD 5	BOD 10	BOD 20	BOD 28
40.000 %	62.000 %	70.000 %	

Theoretical Oxygen Demand: 3.20 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

Data for Component: **Xylene**

Material is expected to be readily biodegradable.

Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
6.5E-12 cm3/s	19.7 h	Estimated.

Biological oxygen demand (BOD):

BOD 5	BOD 10	BOD 20	BOD 28
37.000 %	58.000 %	72.000 %	

Theoretical Oxygen Demand: 3.17 mg/mg

Bioaccumulative potential

Data for Component: **Chlorpyrifos**

Bioaccumulation: Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).

Partition coefficient, n-octanol/water (log Pow): 4.7 Estimated.

Bioconcentration Factor (BCF): 180; invertebrate; Measured
100 - 1,673; fish; Measured

Data for Component: **1,2,4-Trimethylbenzene**

Bioaccumulation: Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).

Partition coefficient, n-octanol/water (log Pow): 3.63 Measured

Bioconcentration Factor (BCF): 33 - 275; common carp (Cyprinus carpio); Measured

Data for Component: **1,3,5-Trimethylbenzene**

Bioaccumulation: Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).

Partition coefficient, n-octanol/water (log Pow): 3.42 Measured

Bioconcentration Factor (BCF): 161; fathead minnow (Pimephales promelas); Measured

Data for Component: **Cumene**

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

Partition coefficient, n-octanol/water (log Pow): 3.4 - 3.7 Measured

Bioconcentration Factor (BCF): 35.5; fish; Measured

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

Data for Component: **Xylene**

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

Partition coefficient, n-octanol/water (log Pow): 3.12 Measured

Bioconcentration Factor (BCF): 15 - 21; fish; Measured

Mobility in soil

Data for Component: **Chlorpyrifos**

Mobility in soil: Expected to be relatively immobile in soil (Koc > 5000).
Partition coefficient, soil organic carbon/water (Koc): 8,151**Henry's Law Constant (H):** 6.6E-06 atm*m3/mole Measured

Data for Component: **1,2,4-Trimethylbenzene**

Mobility in soil: Potential for mobility in soil is low (Koc between 500 and 2000).
Partition coefficient, soil organic carbon/water (Koc): 720 Estimated.
Henry's Law Constant (H): 6.16E-03 atm*m3/mole; 25 °C Measured

Data for Component: **1,3,5-Trimethylbenzene**

Mobility in soil: Potential for mobility in soil is low (Koc between 500 and 2000).
Partition coefficient, soil organic carbon/water (Koc): 741.65 Estimated.
Henry's Law Constant (H): 1.97E-02 atm*m3/mole; 25 °C Estimated.
Distribution in Environment: Mackay Level 1 Fugacity Model:

Air	Water.	Biota	Soil	Sediment
97.26 %	0.62 %	< 0.01 %	2.08 %	0.05 %

Data for Component: **Cumene**

Mobility in soil: Potential for mobility in soil is low (Koc between 500 and 2000).
Partition coefficient, soil organic carbon/water (Koc): 800 - 2,800 Estimated.
Henry's Law Constant (H): 1.15E-02 atm*m3/mole; 25 °C Measured
Distribution in Environment: Mackay Level 1 Fugacity Model:

Air	Water.	Biota	Soil	Sediment
98.38 %	0.33 %	< 0.01 %	1.26 %	0.03 %

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.

Data for Component: **Xylene**

Mobility in soil: Potential for mobility in soil is medium (Koc between 150 and 500).
Partition coefficient, soil organic carbon/water (Koc): 443 Estimated.
Henry's Law Constant (H): 7.45E-03 atm*m3/mole; 25 °C 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: ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC, FLAMMABLE
Technical Name: CHLORPYRIFOS, AROMATIC NAPHTHA
Hazard Class: 6.1 (3) **ID Number:** UN3017 **Packing Group:** PG III

DOT Bulk

Proper Shipping Name: ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC, FLAMMABLE
Technical Name: CHLORPYRIFOS, AROMATIC NAPHTHA
Hazard Class: 6.1 (3) **ID Number:** UN3017 **Packing Group:** PG III

IMDG
Proper Shipping Name: ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC, FLAMMABLE
Technical Name: CHLORPYRIFOS, AROMATIC NAPHTHA
Hazard Class: 6.1 (3) **ID Number:** UN3017 **Packing Group:** PG III
EMS Number: F-E,S-D
Marine pollutant.: Yes

ICAO/IATA
Proper Shipping Name: ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC, FLAMMABLE
Technical Name: CHLORPYRIFOS, AROMATIC NAPHTHA
Hazard Class: 6.1 (3) **ID Number:** UN3017 **Packing Group:** PG III
Cargo Packing Instruction: 663
Passenger Packing Instruction: 655
Additional Information

Reportable quantity: 2 lb – CHLORPYRIFOS, 20,816 lb – XYLENE

MARINE POLLUTANT
CHLORPYRIFOS

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
1,2,4-Trimethylbenzene	95-63-6	14.4%
Cumene	98-82-8	1.9%

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
Chlorpyrifos	2921-88-2	44.9%
1,2,4-Trimethylbenzene	95-63-6	14.4%
1,3,5-Trimethylbenzene	108-67-8	3.8%
Cumene	98-82-8	1.9%
2-Ethylhexanol	104-76-7	1.0%

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
Chlorpyrifos	2921-88-2	44.9%
Cumene	98-82-8	1.9%
Xylene	1330-20-7	0.4%

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
	2	2	1

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DAS Code: GF-1400
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.

Dow AgroSciences LLC 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.