



MATERIAL SAFETY DATA SHEET

SHADOW™ RTM

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Please read the entire document. This Material Safety Data Sheet contains important environmental, health and toxicology information for your employees, and anyone who will use, transport, store, dispose of or handle this product. Please make sure this information is given to them. It also contains information to help you meet community right-to-know/emergency response reporting requirements under WHMIS. If you resell this product, this MSDS must be given to the buyer or the information contained herein must be incorporated in your MSDS.

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Shadow® RTM EC POST EMERGENCE HERBICIDE
PMRA REGISTRATION NUMBER: 29277
SYNONYM(S): SELECT®, SELECT® 2EC-H (NPEO-free)

DISTRIBUTED BY: Viterra Inc.
2625 Victoria Ave.
Regina, SK S4T 7T9
1-866-569-4411
For Emergency Call: 1-877-943-2876

Manufactured for Viterra by:
Arysta LifeScience North America LLC
15401 Weston Parkway, Suite 150
Cary, NC 27513

EMERGENCY TELEPHONE NUMBERS	
HEALTH EMERGENCY:	SPILL EMERGENCY:
1-866-303-6952, or 1-651-632-8946	1-800-424-9300, or 1-703-527-3887

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

Active Ingredient(s)/ Hazardous Inert Ingredient(s)	CAS #	Exposure Limits*	% Weight	% Volume
Clethodim	99129-21-2	None	25	NA

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Active Ingredient(s)/ Hazardous Inert Ingredient(s)	CAS #	Exposure Limits*	% Weight	% Volume
Petroleum Solvent containing:	64742-94-5		75	NA
Naphthalene	91-20-3	<p>TWA^a</p> <p>OSHA PEL^d: 10 ppm 50 mg/m³</p> <p>ACGIH TLV^e: 10 ppm 52 mg/m³</p> <p>NIOSH REL^f: 10 ppm 50 mg/m³</p> <p>STEL^b/CEIL(C)^c</p> <p>OSHA PEL: None</p> <p>ACGIH TLV: 15 ppm 79 mg/m³</p> <p>NIOSH REL: 15 ppm 75 mg/m³</p>		
Trimethylbenzene	108-67-8	<p>TWA</p> <p>OSHA PEL: None</p> <p>ACGIH TLV: 25 ppm 123 mg/m³</p> <p>NIOSH REL: 25 ppm 123 mg/m³</p> <p>DFG MAK^g: 20 ppm 100 mg/m³</p>		

Only the identities of the active ingredient(s) and any hazardous inert ingredients are listed. Specific information on all of this product's ingredients can be obtained by the treating medical professional or spill emergency responder for the management of exposures, spills, or safety assessments.

*Source: *Guide to Occupational Exposure Values 2008*, published by ACGIH

^a**TWA**: Time-weighted average exposure concentration for a conventional 8-hour (TLV, PEL) or up to a 10-hour (REL) workday and a 40-hour workweek.

^b**STEL**: Short-Term Exposure Limit. Usually a 15-minute time-weighted average (TWA) exposure that should not be exceeded at any time during the workday, even if the 8-hour TWA is within the TLV-TWA, REL-TWA, or REL-TWA.

^c**CEIL(C)**: The concentration that shall not be exceeded during any part of the working exposure. NIOSH Ceiling – The exposure that shall not be exceeded during any part of the workday. If instantaneous monitoring is not feasible, the ceiling shall be assessed as a 15-minute TWA exposure (unless otherwise specified) that shall not be exceeded at any time during the workday.

^d**OSHA PEL**: Occupational Safety and Health Administration Permissible Exposure Limits.

^e**ACGIH TLV**: American Conference of Governmental Industrial Hygienists, Inc., Threshold Limit Values.

^f**NIOSH REL**: National Institute for Occupational Safety and Health Recommended Exposure Limits.

^g**DFG MAK**: Federal Republic of Germany (DFG), Commission for the Investigation of Health Hazards of Chemical Compounds in the Work Area 1999 Maximum Concentration Values in the Workplace (MAKs).

SECTION 3: HAZARDS IDENTIFICATION**EMERGENCY OVERVIEW**

WARNING:

- **CAUSES EYE AND SKIN IRRITATION**
- **HARMFUL IF SWALLOWED OR INHALED**
- **DO NOT GET IN EYES, ON SKIN, OR ON CLOTHING**
- **AVOID BREATHING VAPOR OR SPRAY MIST**
- **ASPIRATION HAZARD**
- **COMBUSTIBLE**
- **KEEP OUT OF REACH OF CHILDREN**

Acute Health Hazards

Signs and Symptoms of Systemic Effects: Signs of toxicity from short-term exposure to test animals given lethal or near-lethal doses included lethargy, ataxia, irregular breathing, lacrimation and loose stools. Inhalation of this product may cause nasal and respiratory irritation, central nervous system effects including dizziness, weakness, fatigue, nausea, headache and possible unconsciousness, and even death. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Eye: Based on an evaluation of the ingredients and/or similar products, this product may cause prolonged and/or substantial irritation following eye contact. The degree of the injury will depend on the amount and duration of the contact and the speed and thoroughness of the first aid treatment. The expected adverse effects resulting from an exposure may include redness, swelling and pain that could last for an extended period of time.

Skin: Based on an evaluation of the ingredients and/or similar products, this product is expected to cause moderate skin irritation. The degree of injury will depend on the amount and duration of the contact and the speed and thoroughness of the first aid treatment. The expected adverse health effects may include redness and swelling. Based on an evaluation of the ingredients and/or similar products, this product is expected to be minimally toxic if absorbed through the skin. The degree of injury will depend on the amount of material absorbed and the speed and thoroughness of the first aid treatment. The expected adverse systemic health effects resulting from an acute over-exposure are described above.

Ingestion: Ingestion of this product may cause gastrointestinal irritation, nausea, vomiting and diarrhea. Because of the low viscosity of this product, it can directly enter the lungs if swallowed (aspiration) or when vomiting.

Inhalation: Exposure to very high concentrations may result in respiratory irritation. Signs and symptoms may include nasal discharge, sore throat, coughing and difficulty in breathing.

Chronic Health Hazards (Including Cancer): Clethodim Technical was not carcinogenic to animals. Increased liver weights and anemia have been observed in animals exposed to Clethodim Technical.

Teratology (Birth Defects) Information: Clethodim Technical is not a teratogen.

Reproduction Information: Clethodim Technical is not a reproductive toxicant.

Potentially Aggravated Condition: Individuals with preexisting diseases of the liver, red blood cell or central nervous system may have increased susceptibility to the toxicity of excessive exposures.

SECTION 4: FIRST AID MEASURES

Eyes: Flush eyes immediately with plenty of fresh water for at least 15 minutes while holding the eyelids open. Remove contact lenses if worn. However, if irritation persists, see a doctor.

Ingestion: If swallowed, drink 1 or 2 glasses of water and telephone for medical advice. Do not make person vomit unless directed to do so by medical personnel. If medical advice cannot be obtained, then take person and product container to the nearest emergency treatment center or hospital.

Skin: Remove contaminated clothing, wash skin with plenty of soap and water. See a doctor if any signs or symptoms described in this document occur. Discard contaminated non-waterproof shoes and boots. Wash contaminated clothing before re-wearing.

Inhalation: If respiratory discomfort or irritation occurs, move the person to fresh air. See a doctor if discomfort or irritation continues.

Notes to Physician: This material contains light hydrocarbon liquid and an aspiration hazard may exist.

SECTION 5: FIRE FIGHTING MEASURES

Flammable Limits in Air (% by volume):		
	Upper:	NDA
	Lower:	NDA
Flash Point:		145°F
	Method Used:	Closed Cup
Autoignition Temperature:		NDA
LEL/UEL:		NDA
NFPA Hazard Classification:		
	Health:	2
	Flammability:	2
	Reactivity:	1
	Other:	NDA
Extinguishing Media:		CO ₂ , dry chemical, foam, water fog
Special Fire Fighting Procedures:		Liquid evaporates and forms vapor (fumes) that 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 29°C (85°F). Products of combustion from fires involving this material may be toxic. Avoid breathing smoke and mists. Avoid personnel and equipment contact with fallout and runoff. Minimize the amount of water used for fire fighting. Do not enter any enclosed area without full protective equipment, including SCBA. Contain and isolate runoff and debris for proper disposal. Decontaminate personal protective equipment and fire fighting equipment before reuse.
Hazardous Combustion Products:		Normal combustion forms carbon dioxide, water vapor and may produce oxides of sulfur, nitrogen and toxic chlorine compounds. Incomplete combustion can produce carbon monoxide.

SECTION 6: ACCIDENTAL RELEASE MEASURES

EMERGENCY PHONE NUMBERS

Exposure Calls (PROSAR): 1-866-303-6952 or 1-651-632-8946 (International)

Spill Calls (CHEMTREC): 1-800-424-9300 or 1-703-527-3887

Avoid runoff into storm sewers and ditches that lead to waterways. Contain spilled liquids with dry sorbents. Clean up spill immediately. Absorb spill with inert materials (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 disposable container. This material forms an emulsion in water. Stop or reduce contamination of any water. Isolate contaminated water. Remove contaminated water for removal or treatment.

SECTION 7: HANDLING AND STORAGE

It is a violation of federal law to use this product in a manner inconsistent with its labeling. Read entire label. Use strictly in accordance with label precautionary statements and directions. 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. Before entry into confined spaces that may have contained hazardous material, determine concentrations and take appropriate measures for personal protection. Material presents a hazard that may require personal protective equipment for entry. Keep pesticide in original container. Do not store or transport near food or feed.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Eye Protection: Do not get this material in your eyes. Avoid eye contact by wearing chemical eyewear.

Respiratory/Ventilation Requirements: This material may be an inhalation hazard and, unless ventilation is adequate, the use of approved respiratory protection is recommended. Use this material only in well-ventilated areas.

Skin Protection: Avoid contact with skin or clothing. Skin contact should be minimized by wearing protective clothing including gloves.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear amber color
Odor:	Aromatic
Physical State:	Liquid
pH:	3.6 in 5% emulsion
Boiling Point:	NDA
Melting Point:	NA
Freezing Point	NDA
Vapor Pressure:	NDA
Vapor Density:	NDA
Specific Gravity:	0.96 g/ml @ 20°C
Evaporation Rate:	NDA
Solubility in Water:	Soluble in hydrocarbon solvents. Insoluble in water.
Percent Solids by Weight:	NA
Percent Volatile:	NDA
Volatile Organic Compounds (VOC):	NDA
Molecular Weight:	NDA
Viscosity:	2.05 cps @ 25°C
Corrosion Characteristics:	NDA

SECTION 10: STABILITY AND REACTIVITY

Chemical Stability:	Unstable at extreme pH's, temperatures and upon exposure to UV light.
Hazardous Polymerization:	Polymerization will not occur.
Incompatibility With Other Materials:	May react with strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
Hazardous Decomposition Products:	NDA
Impact Explodability:	NDA
Oxidation/Reduction Properties:	NDA

SECTION 11: TOXICOLOGICAL INFORMATION

Acute (Product Specific Information)

Eye Irritation: No product toxicology data available. A similar product, Select 2EC Herbicide (Low Flash Point), produced mild iritis and severe conjunctival irritation with corneal opacity, clearing within 14 days after exposure.

Skin Irritation: No product toxicology data available. A similar product, Select 2EC Herbicide (Low Flash Point), produced severe irritation at 72 hours after exposure.

Dermal Toxicity: No product toxicology data available. A similar product, Select 2EC Herbicide (Low Flash Point), had a dermal LD₅₀ > 5 g/kg.

Oral Toxicity: No product toxicology data available. However, the oral LD₅₀ of a similar product, Select 2EC Herbicide (Low Flash Point), was 3.61 g/kg in male rats and 2.92 g/kg in female rats.

Inhalation Toxicity: No product toxicology data available. However, the 4-hour inhalation LC₅₀ for a similar product, Select 2EC Herbicide (Low Flash Point) was > 5.4 mg/L.

Skin Sensitization: No product toxicology data available. The active ingredient, Clethodim Technical and a similar product, Select 2EC Herbicide (Low Flash Point), were not skin sensitizers in the modified Buehler Guinea Pig Sensitization Test.

Subchronic Toxicity: 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: Using Clethodim Technical, no treatment related increases in neoplasms were observed in any study.

Teratology/Developmental Toxicity: Developmental toxicity in rats and rabbits was observed only at maternally toxic dose levels of Clethodim Technical.

Reproduction: No reproductive toxicity was observed in a study with rats exposed to Clethodim Technical for two generations.

Mutagenicity: Clethodim Technical was negative in the following genotoxicity assays: microbial reverse mutation (Ames Assay), in vitro chromosome aberration assay in Chinese Hamster Ovary Cells, in vitro chromosome aberration assay in Rat Bone Marrow Cells and in vitro Unscheduled DNA Synthesis Assay. Clethodim Technical does not present a genetic hazard to intact animal systems.

Other: This product contains an inert ingredient that, when inhaled, can cause nasal and respiratory irritation, central nervous system effects including dizziness, weakness, fatigue, nausea, headache and possible unconsciousness and even death. Ingestion of this chemical can cause gastrointestinal irritation, nausea, vomiting, and diarrhea. Aspiration of material into the lungs can cause chemical pneumonitis that can be fatal.

SECTION 12: ECOLOGICAL INFORMATION

Avian Toxicity: The acute toxicity of Clethodim Technical to birds is very low.

Bobwhite quail oral LD₅₀ > 2 g/kg
Bobwhite quail dietary LC₅₀ > 6,000 ppm
Mallard duck dietary LC₅₀ > 6,000 ppm

No reproductive effects were observed in mallard ducks exposed to 1,000 ppm of Clethodim Technical. In Bobwhite quail, a slight decrease in viability of embryos of eggs from females exposed to 1,000 ppm was observed. A NOEL was established at 300 ppm of this study.

Aquatic Organism Toxicity: Clethodim Technical is only slightly toxic to freshwater fish and practically nontoxic to Daphnia.

Rainbow Trout 96-hour LC₅₀ = 67 mg/L
Bluegill Sunfish 96-hour LC₅₀ = 120 mg/L
Daphnia magna 48-hour LC₅₀ > 120 mg/L

Other Non-Target Organism Toxicity: Clethodim Technical was found to be nontoxic to adult worker bees at the highest dose tested, 100 micrograms/bee.

SECTION 13: DISPOSAL CONSIDERATIONS

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

SECTION 14: TRANSPORT INFORMATION

SHIPMENTS DESTINED FOR INTERNATIONAL LOCATIONS ARE NOT REGULATED. FOR QUANTITIES LESS THAN 119 GALLONS THIS MATERIAL IS NOT REGULATED ACCORDING TO U.S. DEPARTMENT OF TRANSPORTATION

Descriptors for tank car shipments within the United States & Canada:

D.O.T. Shipping Name:	Combustible liquid (naphthalene, Trimethylbenzene) III, RQ (naphthalene)
Technical Shipping Name:	Clethodim
Packing Group:	NA
D.O.T. Hazard Class:	Combustible
U.N/N.A. Number:	NA1993
Product RQ (lbs):	100 (naphthalene)
D.O.T. Label:	NA
D.O.T. Placard:	Combustible
Marine Pollutant:	NDA
IMO :	
IMO Label:	NDA
IMO Placard:	NDA
European Road/Rail:	
Class:	NDA

SECTION 15: REGULATORY INFORMATION

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

International Regulations:

EEC Classification (directive 67/548/EEC): Xn, Harmful

Risk Phrases:
 R36/38; Irritating to eye and skin
 R52; Harmful for aquatic organisms
 R65; Harmful: may cause lung damage if swallowed

Safety Phrases:
 S2; Keep out of reach of children
 S13; Keep away from food, drink and animal feeding stuffs
 S37; Wear suitable gloves
 S46; If swallowed, seek medical advice immediately and show this container or label
 S49; Keep only in the original container
 S62; If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label

SECTION 16: OTHER INFORMATION

Reason for issue:	New MSDS
Prepared by:	Ashley R. Brown
Issue date:	05/08/09
Supersedes date:	NA
MSDS number:	00413

The information in this MSDS is based on data available to us as of the issue date given herein, and believed to be correct. Contact Arysta LifeScience North America LLC at (919) 678-4900 to determine if additional data and information have become available since the issue date.

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