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**In Case of Emergency, Call
1-800-327-8633 (FAST MED)**

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MSDS prepared by:
Department of Regulatory & Biology Development
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SECTION – 1: PRODUCT IDENTIFICATION

Product Identifier: ACHIEVE® 80DG Herbicide
Registration Number: 24117 (Pest Control Products Act)
Chemical Class: Cyclohexandione herbicide
Synonym: None

Formulation No.: A12851A

Active Ingredient(%): Tralkoxydim (80.0 %)
Chemical Name: 2-Cyclohexen-1-one,2-[1-(ethoxyimino)propyl]-3-hydroxy-5(2,4,6-trimethylphenyl)-(9CI)
Product Use: ACHIEVE is a systemic, post-emergence herbicide for the selective control of grasses in cereals. For further details please refer to product label.

CAS No.: 87820-88-0

SECTION – 2 : COMPOSITION/INFORMATION ON INGREDIENTS

Material	OSHA PEL	ACGIH TLV	Other	NTP/IARC/OSHA Carcinogen	WHMIS†
Talc CAS # 14807-96-6	20 mppcf (containing < 1% quartz).	2 mg/m ³ (respirable; < 1% crystalline silica) TWA	NIOSH REL 2 mg/m ³ (respirable) TWA	IARC Group 3	Yes
Tralkoxydim (80.0 %)	Not Established	Not Established	3 mg/m ³ TWA***	No	Not Established

*** Syngenta Occupational Exposure Limit (OEL)

† Material listed in Ingredient Disclosure List under Hazardous Products Act.

Ingredients not precisely identified are proprietary or non-hazardous. Values are not product specifications.

SECTION – 3: HAZARDS IDENTIFICATION

Symptoms of Acute Exposure

Harmful if inhaled or swallowed. Dust, mist or vapour irritating to eyes and respiratory tract. May cause eye and skin irritation.

Hazardous Decomposition Products

Energetically decomposes at approximately 100 °C (212 °F).

Physical Properties

Appearance: Aqua blue granules.

Odour: Slight burnt odour.

Unusual Fire, Explosion and Reactivity Hazards

Mixtures of powder in air with flammable solvent vapors should be avoided. Achieve 80DG has a minimum ignition energy between 3 and 10 millijoules. Static electricity, mechanical sparks, open flames and certain hot surfaces can serve as ignition sources for this material. Handle this material only in electrically conductive equipment. Electrically ground and bond this equipment as well as any worker who could contact a dust cloud formed of this material. Eliminate the presence of mechanical sparks and other ignition sources where dust clouds of this material could form. Bulk bags (FIBC) used to contain this material should be either type B or type C. If type C bags are used, make sure they are electrically grounded before powder is discharged from the bag.

When present as a fine dust, this material is considered explosion class (Kst) 3 and consequently an explosion involving this powder cannot be adequately suppressed using standard suppression agents and equipment. Achieve 80DG can energetically decompose at approximately 100 °C (212 °F).

Potential Health Effects

Relevant routes of exposure: Skin, eyes, mouth, lungs.

Adverse health effects from exposure to product or ingredients of product:

May be irritating via ocular, dermal and inhalation routes.

SECTION – 4: FIRST AID MEASURES

IF POISONING IS SUSPECTED, immediately contact the poison information centre, doctor or nearest hospital. Have the product container, label or Material Safety Data Sheet with you when calling Syngenta, a poison control center or doctor, or going for treatment. Tell the person contacted the complete product name, and the type and amount of exposure. Describe any symptoms and follow the advice given. Call the Syngenta Emergency Line [**1-800-327-8633 (1-800-FASTMED)**], for further information.

EYE CONTACT: Immediately flush eyes with clean water, holding eyelids apart for a minimum of 20 minutes. Remove contact lenses, if present, after 5 minutes, then continue rinsing eye. Call Syngenta, a poison control center or doctor for treatment advice. Obtain medical attention immediately if irritation persists.

SKIN CONTACT: Immediately remove contaminated clothing and wash skin, hair and fingernails thoroughly with soap and water. Flush skin with running water for a minimum of 20 minutes. Obtain medical attention if irritation occurs.

INHALATION: Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is laboured, give oxygen. Obtain immediate medical attention.

INGESTION: If swallowed, immediately contact Syngenta, a poison control centre, doctor or nearest hospital for treatment advice. Provided the patient is conscious, wash out mouth with water. Do not give anything by mouth to an unconscious person. Do not induce vomiting unless directed by a physician or a poison control center. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer water.

NOTES TO PHYSICIAN:

There is no specific antidote if this product is ingested. Treat symptomatically.

MEDICAL CONDITIONS KNOWN TO BE AGGRAVATED:

Asthma or other respiratory conditions aggravated by chemical irritants.

SECTION – 5: FIRE FIGHTING MEASURES

Flash point and method: Not applicable.

Upper and lower flammable (explosive) limits in air: Not available.

Auto-ignition temperature: Not available.

Flammability: Combustible solid.

Hazardous combustion products: Achieve 80DG is a combustible powder and like all combustible powders can ignite, burn and form explosive mixtures with air if not handled correctly. Mixtures of powder in air with flammable solvent vapours should be avoided. Achieve 80DG will burn vigorously with flames and can be a fire hazard. During a fire, irritating and possibly toxic gases may be generated by thermal decomposition or combustion.

Conditions under which flammability could occur: High heat, sparks, open flames and other sources of ignition. Mixtures of powder in air with flammable solvent vapors should be avoided. Achieve 80DG has a minimum ignition energy

between 3 and 10 millijoules. Static electricity, mechanical sparks, open flames and certain hot surfaces can serve as ignition sources for this material. Handle this material only in electrically conductive equipment. Electrically ground and bond this equipment as well as any worker who could contact a dust cloud formed of this material. Eliminate the presence of mechanical sparks and other ignition sources where dust clouds of this material could form. Bulk bags (FIBC) used to contain this material should be either type B or type C. If type C bags are used, make sure they are electrically grounded before powder is discharged from the bag.

When present as a fine dust, this material is considered explosion class (Kst) 3 and consequently an explosion involving this powder cannot be adequately suppressed using standard suppression agents and equipment. Achieve 80DG can energetically decompose at approximately 100 °C (212 °F).

Extinguishing media: Use foam, carbon dioxide, dry powder, water mist or fog (avoid water jet) or halon extinguishant. Wear full protective clothing and self-contained breathing apparatus. Evacuate nonessential personnel from the area to prevent human exposure to fire, smoke, fumes or products of combustion. Prevent use of contaminated buildings, area, and equipment until decontaminated. Water runoff can cause environmental damage. Contain run-off water with, for example, temporary earth barriers.

Sensitivity to explosion by mechanical impact: No.

Sensitivity to explosion by static discharge: High.

SECTION – 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions: Make sure all personnel involved in the spill cleanup follow good industrial hygiene practices. A small spill can be handled routinely. Wear suitable protective clothing and eye protection to prevent skin and eye contact. Use adequate ventilation and wear an air-supplied respirator to prevent inhalation.

Procedures for dealing with release or spill: Control the spill at its source. Contain the spill to prevent from spreading or contaminating soil or from entering sewage and drainage systems or any body of water. Clean up spills immediately, observing precautions outlined in Sections 7 and 8. Scoop or sweep up material and place into a disposal container. Wash area with detergent and water. Pick up wash liquid with additional absorbent and place into compatible disposal container. On soils, skim off the upper contaminated layer and collect for disposal. Once all material is cleaned up and placed in a disposal container, seal container and arrange for disposition. Spillages or uncontrolled discharges into watercourses must be alerted to the appropriate regulatory body.

SECTION – 7: HANDLING AND STORAGE

Handling practices: KEEP OUT OF REACH OF CHILDREN and animals. Prevent eating, drinking, tobacco use, and cosmetic application in areas where there is a potential for exposure to the material. After work, rinse gloves and remove protective equipment. Wash hands thoroughly with soap and water after handling, and before eating, tobacco use, drinking, or using the toilet. Wash contaminated clothing before re-use and separate from household laundry. Keep containers closed when not in use. Keep product, wash or rinse water, and contaminated materials out of water, away from crops, and away from access by people, animals and birds.

Appropriate storage practices/requirements: Store in original container only in a well-ventilated, cool, dry, secure area. Protect from heat, sparks and flame. Do not expose containers to temperatures above 40 °C. Keep separate from other products to prevent cross contamination. Rotate stock. Clean up spilled material immediately.

National Fire Code classification: Not applicable.

SECTION – 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Applicable control measures, including engineering controls: This product is intended for use outdoors where engineering controls are not necessary. If necessary, ensure work areas have ventilation, containment, and procedures sufficient to maintain airborne levels below the TLV. Warehouses, production area, parking lots and waste holding facilities must have adequate containment to prevent environmental contamination. Provide separate shower and eating facilities.

THE FOLLOWING RECOMMENDATIONS FOR EXPOSURE CONTROLS/PERSONAL PROTECTION ARE INTENDED FOR THE MANUFACTURE, FORMULATION, PACKAGING AND USE OF THIS PRODUCT.

FOR COMMERCIAL APPLICATIONS AND/OR ON-FARM APPLICATIONS CONSULT THE PRODUCT LABEL.

Personal protective equipment for each exposure route:

General: Avoid breathing dust, vapours or aerosols. Avoid contact with eye, skin and clothing. Wash thoroughly after handling and before eating, drinking, or handling tobacco.

INGESTION: Do not eat, drink, handle tobacco, or apply cosmetics in areas where there is a potential for exposure to this material. Always wash thoroughly after handling.

EYES: Where eye contact is likely, use chemical splash goggles. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

SKIN: Where contact is likely, wear chemical-resistant (such as nitrile or butyl) gloves, coveralls, socks and chemical-resistant footwear. For overhead exposure, wear chemical-resistant headgear.

INHALATION: A respirator is not normally required when handling this substance. Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below exposure limits. A NIOSH-certified combination air-purifying respirator with an N, P or R 95 or HE class filter and an organic vapor cartridge may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a pressure demand atmosphere-supplying respirator if there is any potential for uncontrolled release, exposure levels are not known, or under any other circumstances where air-purifying respirators may not provide adequate protection.

SECTION – 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Aqua blue granules.

Formulation Type: Solid (granule).

Odour: Slight burnt odour.

pH: 5.9 (1% dilution in deionized water).

Vapour pressure and reference temperature: 4×10^{-10} mmHg @ 22 °C (Tralkoxydim Technical).

Vapour density: Not available.

Boiling point: Not available.

Melting point: > 104 °C.

Freezing point: Not applicable.

Specific gravity or density: 0.72 g/cm³ @ 25 °C.

Evaporation Rate: Not available.

Water/oil partition coefficient: 2.1 @ 20 °C (Tralkoxydim Technical).

Odour threshold: Not available.

Viscosity: Not applicable.

Solubility in Water: 7 mg/L @ 20 °C (Tralkoxydim Technical).

SECTION – 10: STABILITY AND REACTIVITY

Chemical stability: Stable under normal use and storage conditions.

Conditions to avoid: Formation of dust clouds. Do not store or process at temperatures above 50 °C. Do not expose to high temperatures or sources of heat, including sunlight and steam lines.

Incompatibility with other materials: Strong oxidizing agents.

Hazardous decomposition products: Energetically decomposes at approximately 100 °C (212 °F). During a fire, irritating and possibly toxic gases may be generated by thermal decomposition or combustion.

Hazardous polymerization: Will not occur.

SECTION – 11: TOXICOLOGICAL INFORMATION**Acute toxicity/Irritation Studies (Finished Product):**

Ingestion:	<u>Slightly Toxic</u>	
	Oral (LD50 Rat):	> 934 mg/kg body weight
Dermal:	<u>Slightly Toxic</u>	
	Dermal (LD50 Rat):	> 2,000 mg/kg body weight

Inhalation:	<u>Practically Non-Toxic</u> Inhalation (LC50 Rat):	> 3.5 mg/L air - 4 hours
Eye Contact:	<u>Slightly Irritating (Rabbit)</u>	
Skin Contact:	<u>Slightly Irritating (Rabbit)</u>	
Skin Sensitization:	<u>Not a Sensitizer (Guinea Pig)</u>	

Reproductive/Developmental Effects

Tralkoxydim Technical: No evidence of reproductive toxicity at any level in rabbit tests. No evidence of genotoxicity in Ames, L5178Y, mouse micronucleus and UDS assays.

Chronic/Subchronic Toxicity Studies

Tralkoxydim Technical: Rat studies have shown effects on the liver and the retina; and Leydig cell hyperplasia development of testicular and benign tumors at a dose of 2500 ppm. Lifetime hamster studies showed a decreased lymphocyte level and increased liver pigment at 2500 ppm and above. A 90-day dog study showed signs of minor hepatotoxicity at 5 mg/kg/day (increased liver weights and enzyme changes).

Carcinogenicity

Tralkoxydim Technical: No evidence of carcinogenic effects in hamster studies. However, the EPA has classified tralkoxydim as a likely human carcinogen based on a) increased Leydig cell tumors in a rat study, b) no data to support a mechanism for tumors that is not relevant to man, and c) inadequate data on a second species.

Other Toxicity Information:

Inhalation of talc dust (containing no asbestos fibers and < 1% crystalline silica) during normal use of this product presents a minimal respiratory hazard.

Toxicity of Other Components

The acute toxicity test results reported in Section 11, above, for the finished product take into account any acute hazards related to the “other components” in the formulation.

Talc

Prolonged inhalation of talc may cause scarring of the lungs, shortness of breath and respiratory assisted heart failure. Contact with the skin can cause dryness.

Other materials that show synergistic toxic effects together with the product: None known.

Target Organs

Active Ingredients

Tralkoxydim Technical: Liver, eye, skin, testicles.

Inert Ingredients

Talc: Respiratory tract.

SECTION – 12: ECOLOGICAL INFORMATION

Summary of Effects

ACHIEVE is an herbicide that is mixed with water and applied as a spray for post-emergence control of various annual grasses in small grain cereals. The active ingredient, tralkoxydim, is practically nontoxic to birds, insects (bees), and aquatic invertebrates (water flea), and slightly toxic to fish.

Eco-Acute Toxicity

Tralkoxydim Technical:

Bees LC ₅₀ /EC ₅₀	> 100 µg/bee
Invertebrates (<i>Daphnia magna</i>) 48-hour LC ₅₀ /EC ₅₀	> 175 ppm
Green Algae 5-Day EC ₅₀	7.6 ppm
Fish (Rainbow Trout) 96-hour LC ₅₀ /EC ₅₀	> 7.2 ppm
Fish (Bluegill) 96-hour LC ₅₀ /EC ₅₀	> 6.1 ppm
Fish (Mirror Carp) 96-hour LC ₅₀ /EC ₅₀	> 8.2 ppm
Mallard Duck Oral LD ₅₀	> 3,020 ppm
Birds (8-day dietary - Bobwhite Quail) LC ₅₀ /EC ₅₀	6,237 ppm
Birds (8-day dietary - Mallard Duck) LC ₅₀ /EC ₅₀	> 7,400 ppm

Eco-Chronic Toxicity

Tralkoxydim Technical:

Fish (Rainbow Trout) 28-Day	NOEC 4.6 mg/L
Mallard Reproduction NOEC	> 150 ppm (in feed)
Bobwhite Reproduction NOEC	> 150 ppm (in feed)

Environmental Fate

The information available from the active ingredient studies and from field studies done with a 50% dry flowable formulation indicates that the soil half life of tralkoxydim applied as Achieve is expected to be very brief; approximately of 1-2 days. The active ingredient is neither volatile nor persistent in water. Under laboratory conditions, tralkoxydim degrades rapidly in soil; typical DT₅₀ = 2-5 d (aerobic), or 3 weeks (anaerobic flooded soil). Primary metabolites are also extensively degraded; within 30 days. Degradation is primarily microbial, but soil surface photolysis, aqueous photolysis and hydrolysis all occur. The K_{oc} of 30-300 predicts relatively strong binding; however, rapid degradation ensures that there is no significant movement of either tralkoxydim or degradates with increasing soil depth.

SECTION – 13: DISPOSAL CONSIDERATIONS

Waste disposal information: Do not reuse empty containers. Empty container retains product residue. Triple rinse, or equivalent, empty container, return rinse water to dilution mixture, and dispose of dilution mixture as a hazardous waste if it cannot be disposed of by use according to label instructions. Dispose of empty containers in accordance with local regulations. Consult provincial environment ministry for advice on waste disposal. Industrial/commercial waste may be handled at licensed facilities only. Waste shipments must be securely packaged and properly labelled. Only licensed carriers may be used, and proper documents must accompany the shipment.

SECTION – 14 : TRANSPORT INFORMATION

Shipping information such as shipping classification:

TRANSPORTATION OF DANGEROUS GOODS CLASSIFICATION - ROAD/RAIL
Not Regulated.

IATA CLASSIFICATION - AIR
Not Regulated.

SECTION – 15: REGULATORY INFORMATION

WHMIS classification for product: Exempt

A statement that the MSDS has been prepared to meet WHMIS requirements, except for use of the 16 headings.

This MSDS has been prepared in accordance with WHMIS requirements, but the data are presented under 16 headings.

Other regulations; restrictions and prohibitions

Pest Control Products (PCP) Act Registration No.: 24117

SECTION – 16: OTHER INFORMATION

The information contained herein is offered only as a guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and Syngenta will not be liable for any damages, losses, injuries or consequential damages which may result from the use of or reliance on any information contained herein. This Material Safety Data Sheet is valid for three years. This product is under the jurisdiction of the Pest Control Products Act and is exempt from the requirements for a WHMIS compliant MSDS. Hazardous properties of all ingredients have been considered in the preparation of this MSDS. Read the entire MSDS for the complete hazard evaluation of this product.

Prepared by: Syngenta Crop Protection Canada, Inc.
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