

MATERIAL SAFETY DATA SHEET

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

Product identifier: TOPGUARD™ (FLUTRIAFOL 125 g/l SC)

Product use: Fungicide.

Supplier's name and address:

Cheminova Inc.

1700 Route 23, Suite 300

Wayne, NJ, USA

07470

Phone #: (973) 305-6600 (8 AM to 5:00 PM EST, Monday to Friday)

Emergency Telephone #: 1-866-303-6950 (Medical Emergencies)

1-800-424-9300 (24 Hr. Chemtrec Number)

Manufacturer's name and address:

Cheminova A/S.

P.O. Box 9

DK-7620 Lemvig

Denmark

MSDS Prepared by: Cheminova Inc.

MSDS Preparation date: May 25, 2005

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

<u>Ingredients</u>	<u>CAS #</u>	<u>% (weight)</u>	<u>ACGIH TLV (mg/m³)</u>	<u>OSHA PEL (mg/m³)</u>
Flutriafol	76674-21-0	10 - 15	N/Av	N/Av
C13 - C15 Ethoxylated alcohols	68131-39-5	5 - 10	N/Av	N/Av
Propylene glycol	57-55-6	5 - 10	*10 (AIHA WEEL - TWA)	N/Av
1,2-Benzisothiazol-3-(2H)-one	2634-33-5	0.015 - 0.025	N/Av	N/Av

This material is classified as hazardous under OSHA regulations (29CFR 1910.1200).

SECTION 3 — HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Off-white to brown liquid (suspension in water), characteristic fish- or glue-like odor.

Warning! Harmful if swallowed. May be harmful if inhaled. May cause respiratory tract irritation.

Causes eye irritation. Contains material which can cause liver damage.

May be dangerous for the environment. This product is harmful to fish, aquatic invertebrates, aquatic plants and bees.

POTENTIAL HEALTH EFFECTS

Target organs: Eyes, skin, respiratory system, digestive system, liver.

Routes of exposure: Skin contact, eye contact, inhalation, ingestion.

Signs and symptoms of short-term (acute) exposure:

Inhalation: Inhalation may cause irritation to the nose, throat and upper respiratory tract.

Skin contact: Direct skin contact may cause mild irritation. Prolonged contact may be more irritating.

Eye contact: Direct eye contact may cause moderate to severe irritation.

Ingestion: Harmful if swallowed. At high dosage, could cause salivation, depression of activity, muscle spasms, ataxia and increased body temperature, based on animal data.

Effects of long-term (chronic) exposure: Prolonged or repeated overexposure may cause liver damage, even at low levels.

Conditions aggravated by exposure: May aggravate pre-existing liver, skin, eye and respiratory problems.

Carcinogenicity: See TOXICOLOGICAL INFORMATION (Section 11).

Other important hazards: See TOXICOLOGICAL INFORMATION (Section 11).

Potential environmental effects: This material is harmful to aquatic organisms. See ECOLOGICAL INFORMATION (Section 12).

SECTION 4 — FIRST AID MEASURES

Inhalation: Immediately remove victim to fresh air. If breathing has stopped, begin artificial respiration immediately. Obtain medical advice immediately.

Skin: Immediately remove contaminated clothing and shoes. Flush skin with running water for at least 15 minutes. Obtain medical attention if irritation persists. Thoroughly clean contaminated clothing before re-use.

Eyes: Immediately flush eyes with running water for at least 15 to 20 minutes. Get medical attention.

Ingestion: If ingested, do not induce vomiting unless directed to do so by qualified medical personnel. Never give anything by mouth if victim is unconscious or convulsing. Transport to a clinic or hospital immediately.

Note to physician: There is no specific antidote for exposure to this material. Treatment of exposure should be directed at the control of symptoms and the clinical condition.

SECTION 5 — FIRE FIGHTING MEASURES

Fire hazards/conditions of flammability: Not considered flammable. However, if water evaporates, residual material can burn when exposed to extreme heat, flame and other ignition sources. Closed containers may build up pressure and explode when exposed to heat and flame.

Flammability classification (OSHA 29 CFR 1910.1200): Not considered flammable.

Flash point (Method): N/Av

Lower flammable limit (% by volume): N/Av

Upper flammable limit (% by volume): N/Av

Explosion data:

Sensitivity to mechanical impact: Not sensitive.

Sensitivity to static discharge: Not expected to be sensitive to static discharge.

Auto-ignition temperature: N/Av

Suitable extinguishing media: For small fires, use dry chemical or carbon dioxide. For large fires, use water spray or foam.

Special fire-fighting procedures/equipment: Firefighters should wear proper chemically protective equipment and self-contained breathing apparatus operated in positive pressure mode. Move containers from fire area if it can be done without risk. Dike area to prevent water run-off. Water spray may be useful in cooling equipment and containers. Avoid spreading burning material with water jet.

Hazardous combustion products: Carbon oxides, nitrogen oxides, sulfur oxides, hydrogen fluoride and various fluorinated organic compounds.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

Personal precautions: Restrict access to area until completion of clean-up. Ensure clean-up is conducted by trained personnel only. All persons dealing with clean-up should wear the appropriate chemically protective equipment. Refer to Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION, for additional information on acceptable personal protective equipment.

Environmental precautions: Ensure spilled product does not enter drains, sewers, waterways, or confined spaces. Dike far ahead of spill to prevent runoff from entering drains, sewers or waterways.

Spill response/Cleanup: Eliminate all sources of heat, sparks and flame. Ventilate area of release. Stop leak if you can do so without risk. Notify the appropriate authorities. For spills on the floor or other impervious surfaces, absorb spill with inert, non-combustible absorbent material, such as hydrated lime, Fuller's earth or other absorbent clays. Scoop up and place contaminated absorbent material into suitable containers for later disposal (see Section 13). Clean the spill area with soap and water, then rinse thoroughly. Do not allow flush material to enter sewer, drains or waterways. Large spills that soak into the ground should be dug up, placed in suitable containers and disposed of appropriately (see Section 13). Spills in water should be contained as much as possible by isolation of the contaminated water. The contaminated water must be collected and removed for treatment or disposal (see Section 13).

Prohibited materials: None known.

Special spill response procedures: If a spill/release in excess of EPA reportable quantity is made into the environment, immediately notify the national response center (phone: 1-800-424-8002).

EPA/CERCLA Reportable quantity: None reported.

SECTION 7 — HANDLING AND STORAGE

Safe handling procedures: This material is a harmful liquid. In an industrial environment, it is recommended to avoid all personal contact with the product, preferably by use of closed systems. For its use as a pesticide, first look for precautions and personal protection measures on the officially approved label on packaging, or for other official guidance or policy in force. If this guidance is lacking, refer to Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION, for additional information on acceptable personal protective equipment. Use only in well ventilated area. Avoid contact with eyes, skin and clothing. Do not inhale vapors or mists. Keep away from all unprotected persons and children. Do not use near sources of heat, flame or ignition sources. Keep away from oxidizing agents and incompatibles. Use caution when opening containers. Keep container tightly closed when not in use. Wash thoroughly after handling.

Storage recommendations: Store in a cool (<77°F / 25°C), dry, well ventilated area away from incompatibles. Protect container from physical damage. Protect container from frost. Do not store in unlabeled containers. No smoking in the area. Inspect containers periodically for damage or leaks. Do not contaminate water, foodstuffs, feed or seed by storage or disposal.

Special packaging materials: Always keep in containers made of the same materials as the supply container.

SECTION 8 — EXPOSURE CONTROLS AND PERSONAL PROTECTION

Ventilation and engineering controls: If handled indoors, provide mechanical exhaust ventilation to keep concentrations below specified TLV's and PEL's.

Respiratory protection: Respiratory protection is required. When handling operations produce a heavy vapor or mist, wear a pesticide respirator jointly approved by the MSHA and NIOSH under the provisions of 30 CFR Part II. Advice should be sought from respiratory protection specialists.

Protective gloves: Wear impervious chemical gloves, such as heavy duty natural rubber. Advice should be sought from glove suppliers.

Eye protection: Wear chemical splash goggles to prevent fumes and mists from entering the eyes.

Other protective equipment: Wear impervious protective clothing (coveralls, long-sleeved shirts, long pants, and/or shoes and socks) to prevent skin contact. Other protective equipment, such as an eyewash station and safety shower, may be required depending on exposure and on workplace standards.

Permissible exposure levels: See Section 2.

General hygiene considerations: Do not inhale vapors or mists. Avoid contact all contact with eyes, skin and clothing. Before removing gloves, wash them with soap and water. Always wash hands, face and arms with soap and water before smoking, eating or drinking. After work, take off all protective equipment, work clothes and shoes, and wash with soap and water. Wear only clean, uncontaminated clothes when leaving place of work. Keep away from all unprotected persons and children.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

Physical state, odor and appearance: Off-white to brown liquid (suspension in water), characteristic fish- or glue-like odor.

Odor threshold: N/Av

Specific gravity (water = 1): 1.06

Solubility in water: 130 mg/L @ 68°F / 20°C (Flutriafol).

Solubility in organic solvents: Soluble in Acetone, Methanol, Dichloromethane; slightly soluble in Xylene (Flutriafol).

pH: 7 - 9 (1% dispersion in water).

Boiling point: >212°F / 100°C

Melting/freezing point: <32°F / 0°C.

Vapour density (Air=1.0): N/Av

Percent Volatile by Weight: N/Av

Evaporation rate (n-BuAc=1.0): N/Av

Vapour pressure: 5.3×10^{-11} mmHg @ 68°F / 20°C (Flutriafol)

Coefficient of n-Octanol/water distribution: $\log K_{ow} = 2.29$ (Flutriafol)

SECTION 10 — REACTIVITY AND STABILITY DATA

Stability and reactivity: This product is stable at ambient temperatures.

Hazardous polymerization: Hazardous polymerization does not occur.

Conditions to avoid: Avoid heat, flame and direct sunlight.

Materials to avoid (incompatibles): Oxidizing agents, copper, copper alloys.

Hazardous decomposition products: None known. Refer to 'Hazardous combustion products', Section 5.

SECTION 11 — TOXICOLOGICAL INFORMATION

Routes of exposure: Skin contact, eye contact, inhalation, and ingestion.

Toxicological data: LC_{50} (mg/L/4 hrs) = N/Av

LD_{50} , oral, rat (mg/kg) = >2000 (estimated value)

LD_{50} , dermal, rat (mg/kg) = >2000 (estimated value)

Chronic toxicity data: Prolonged or repeated overexposure may cause liver damage, even at low levels. The Lowest Observed Effect Level for this effect, has been found to be approximately 15 mg/kg bw/day in a 90-day feeding study in rats (Flutriafol).

Carcinogenicity: None of the listed ingredients are classified as carcinogenic by IARC, ACGIH, OSHA or NTP.

Teratogenicity, mutagenicity, other reproductive effects: None known.

Sensitization to material: This product is not a sensitizer. However, it contains 0.015 – 0.025% 1,2-Benzisothiazol-3-(2H)-one, a skin sensitizer.

Synergistic materials: Not available.

SECTION 12 — ECOLOGICAL INFORMATION

Ecotoxicological information: The product should not be allowed to enter drains or water courses or be deposited where it can affect ground or surface waters. Do not discharge product unmonitored into the environment. This product is a fungicide and is harmful to fish, aquatic invertebrates, aquatic plants and bees. It is not harmful to birds and soil micro- and macroorganisms. The acute toxicity of the active ingredient, Flutriafol, is measured to be:

Fish – 96-Hr LC_{50} , Rainbow trout (*Salmo gairdneri*) = 7.9 mg/L.

Invertebrates – 48-Hr EC_{50} , Daphnids (*Daphnia magna*) = 7.5 mg/L.

Algae - EC_{50} , Green Algae (*Selenastrum capricornutum*) = 4.6 – 8.6 mg/L

Mobility: The active ingredient, Flutriafol, has moderate mobility in soil. Absorption depends on soil pH and organic matter content.

Persistence and degradability: The active ingredient, Flutriafol, is not readily degradable. Degradation half-lives vary with circumstances, but are usually over 1 year in soil and water.

Bioaccumulative potential: The active ingredient, Flutriafol, is not expected to bioaccumulate. The bioaccumulation factor of flutriafol is measured to be 7 for whole fish (Rainbow trout).

SECTION 13 — DISPOSAL CONSIDERATIONS

Handling for disposal: Handle waste according to recommendations in Section 7.

Methods of disposal: Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Triple rinse (or equivalent) containers, then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill. Disposal must be in compliance with all Federal, State and local regulations. Contact your local, state or federal environmental agency for specific rules.

RCRA: If this product, as supplied, becomes a waste, it may meet the criteria of a hazardous waste as defined under RCRA, Title 40 CFR 261. It is the responsibility of the waste generator to determine the proper waste identification and disposal method. For disposal of unused or waste material, check with local, state and federal environmental agencies.

SECTION 14 — TRANSPORTATION INFORMATION

U.S. 49 CFR information: Not regulated for transportation by ground within the Continental United States

Canadian Transportation of Dangerous Goods Regulations (TDGR) shipping information: Not regulated for transportation by ground within Canada.

SECTION 15 — REGULATORY INFORMATION

Canada:

WHMIS information: This product is a Pest Control Product and is not regulated as a Controlled Product under the Hazardous Products Act (HPA). However, for reference purposes only, this product would have the following WHMIS Classification if it were regulated as a Controlled Product under the HPA: **Class D2B** (*Materials causing other toxic effects, Toxic Material*).

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and this MSDS contains all the information required by the CPR.

SECTION 15 — REGULATORY INFORMATION Continued

United States:

EPA/CERCLA Reportable Quantity (RQ): None reported.

SARA TITLE III: *Sec. 313, Toxic Chemicals Notification, 40 CFR 372:* This material is not subject to the TSCA notification requirements, since it does not contain any Toxic Chemical constituents.

California Proposition 65 information: To the best of our knowledge, this product does not contain any chemicals known to the state of California to cause cancer or reproductive harm.

New Jersey Hazardous Substance Lists: This product contains the following substances required to be disclosed on product labelling:

<u>Chemical Name</u>	<u>CAS #</u>	<u>% (weight)</u>	<u>New Jersey Hazardous Substance</u>
Water	7732-18-5	60 – 100	No
Flutriafol	76674-21-0	10 - 15	No
C13 – C15 Ethoxylated alcohols	68131-39-5	5 – 10	No
Propylene glycol	57-55-6	5 - 10	No
Sulfonated aromatic polymer, sodium salt	N/Av	1 - 5	N/Av

SECTION 16 — OTHER INFORMATION

HMIS Rating:

0 - Insignificant 1 - Slight 2 - Moderate 3 - High 4 – Extreme * - Chronic Hazard

Health: *2 Flammability: 1 Reactivity: 0

Legend:

- ACGIH – American Conference of Governmental Industrial Hygienists
- CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act of 1980
- NIOSH – National Institute for Occupational Safety and Health
- OEHHA – Office of Environmental Health Hazard Assessment
- WEEL – Workplace Environmental Exposure Level
- WHMIS – Workplace Hazardous Materials Information System
- AIHA – American Industrial Hygiene Association
- CFR – Code of Federal Regulations
- IARC – International Agency for Research on Cancer
- MSHA – Mine Safety and Health Administration
- N/Av – Not Applicable
- NTP – National Toxicology Program
- PEL - Permissible Exposure Limit
- SARA - Superfund Amendments & Reauthorization Act
- TSCA – Toxic Substances Control Act
- CAS - Chemical Abstract Service
- EPA – Environmental Protection Agency
- HMIS – Hazardous Materials Identification System
- Inh – Inhalation
- N/Av – Not Available
- OSHA – Occupational Safety and Health Act
- RCRA – Resource Conservation and Recovery Act
- TLV – Threshold Limit Value
- TWA - Time Weighted Average

References:

1. ACGIH, Threshold Limit Values and Biological Exposure Indices for 2004.
2. Canadian Centre for Occupational Health and Safety, CCInfoWeb databases, 2005 (Chempendium and RTECs).
3. Material Safety Data Sheet from manufacturer.
4. International Agency for Research on Cancer Monographs, searched 2005.
5. US EPA Title III List of Lists – January 27, 2005 version.
6. California Proposition 65 List – May 20, 2005 version.

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