

## MATERIAL SAFETY DATA SHEET

### SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

**Product identifier:** NUFOS 15G

**Manufacturer'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)

**MSDS Prepared by:** Cheminova Inc.

**MSDS Preparation date:** August 19, 2003

**Revision date:** January 16, 2004

**Revision reasons:** Refer to Section 16.

**Product use:** Insecticide.

**Supplier's name and address:**

Refer to manufacturer.

### SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

<u>Ingredients</u>	<u>CAS #</u>	<u>% (weight)</u>	<u>ACGIH TLV (mg/m<sup>3</sup>)</u>	<u>OSHA PEL (mg/m<sup>3</sup>)</u>
Chlorpyrifos	2921-88-2	10 - 30	0.1 (inhalable)	N/Av
Crystalline silica, quartz	14808-60-7	5 - 10	0.05 (respirable)	0.1 (final rule limit)

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

### SECTION 3 — HAZARDS IDENTIFICATION

#### EMERGENCY OVERVIEW

Light brown, granular solid, slightly aromatic odor.

Warning! Dangerous exothermic decomposition may occur at temperatures greater than 320°F / 160°C.

May be harmful if inhaled, swallowed or absorbed through the skin.

Contains material which can cause nervous system damage.

Suspect cancer hazard. Contains material which can cause cancer when in the inhalable or respirable form.

May be dangerous for the environment. This material is toxic to aquatic organisms.

#### \*\*\*POTENTIAL HEALTH EFFECTS\*\*\*

**Target organs:** Eyes, skin, respiratory system, digestive system, nervous system.

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

*Inhalation:* This product contains Chlorpyrifos. Chlorpyrifos is a very dangerous poison through inhalation. This material can cause rapid organophosphorous poisoning. Symptoms of poisoning may include headache, nausea, vomiting, blurred vision, tightness in chest, drooling and frothing of mouth and nose, convulsions, coma and death.

*Skin contact:* Direct skin contact causes little or no irritation. Chlorpyrifos can be rapidly absorbed through all skin surfaces. Causes symptoms similar to those listed for inhalation.

*Eye contact:* Direct eye contact may cause mild irritation. Chlorpyrifos can be rapidly absorbed through all skin and eye surfaces. Causes symptoms similar to those listed for inhalation.

*Ingestion:* Chlorpyrifos is a very dangerous poison through ingestion. Causes symptoms similar to those listed for inhalation.

**Effects of long-term (chronic) exposure:** Prolonged or repeated overexposure may cause behavioural changes. Prolonged or repeated overexposure may cause liver effects.

**Carcinogenicity:** Suspect Cancer hazard. See TOXICOLOGICAL INFORMATION (Section 11).

**Other important hazards:** Cholinesterase inhibitor. May cause Central Nervous System depression. May cause damage to the peripheral nervous system. See TOXICOLOGICAL INFORMATION (Section 11).

**Potential environmental effects:** This material is toxic 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. Transport to a clinic or hospital immediately.

**Skin:** Immediately flush skin with running water for at least 15 minutes, while removing contaminated clothing and shoes. Obtain medical attention immediately. Thoroughly clean contaminated clothing before re-use.

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

**Ingestion:** If ingested, induce vomiting immediately only under the direct supervision of qualified medical personnel. Never give anything by mouth if victim is unconscious or convulsing. Transport to a clinic or hospital immediately.

**Note to physician:** Chlorpyrifos is a cholinesterase inhibitor affecting the central and peripheral nervous systems and producing respiratory and cardiac depression. Administer atropine sulphate in large doses. Two to four mg intravenously or intramuscularly as soon as cyanosis is overcome. Repeat at 5 to 10 minute intervals until signs of atropinization appear. Obidoxime chloride (Toxogonin) is a pharmacological antidote and may be administered as an adjunct to, but not a substitute for atropine, which is a symptomatic and often life-saving antidote. **DO NOT GIVE MORPHINE OR TRANQUILIZERS.** At first sign of pulmonary edema, the patient should be given supplemental oxygen and treated symptomatically. Continued absorption of Chlorpyrifos may occur and relapse may occur after initial improvement. **VERY CLOSE SUPERVISION OF THE PATIENT IS INDICATED FOR AT LEAST 48 HOURS.**

#### SECTION 5 — FIRE FIGHTING MEASURES

**Fire hazards/conditions of flammability:** This product is not considered to be flammable. Material will decompose rapidly when exposed to heat and flame. Heat of decomposition may cause closed containers to build up pressure and explode

**Flammability classification (OSHA 29 CFR 1910.1200):** Non-flammable.

**Flash point (Method):** Not applicable. Product is not flammable.

**Lower flammable limit (% by volume):** Not available.

**Upper flammable limit (% by volume):** Not available.

**Explosion data:**

*Sensitivity to mechanical impact:* Not sensitive.

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

**Auto-ignition temperature:** Not available

**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:** Hydrogen chloride, ethyl mercaptan, diethyl sulfide, carbon oxides, nitrogen oxides, phosphorous oxides, sulfur oxides, various chlorinated 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 the spill for later recovery or disposal.

**Spill response/Cleanup:** Eliminate all sources of heat, sparks and flame. Ventilate area of release. Stop leak if you can do so without risk. For spills on the floor or other impervious surfaces, sweep up and place contaminated material into suitable containers for later disposal (see Section 13). Rinse spill area with soda lye. Do not flush to sewer or allow to enter confined spaces. Large spills that soak into the ground should be dug up, placed in suitable containers and disposed of appropriately (see Section 13). Notify the appropriate authorities.

**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: Chlorpyrifos (RQ 1 lb.)

## SECTION 7 — HANDLING AND STORAGE

**Safe handling procedures:** This material is a highly toxic granular solid. Wear full chemically protective equipment during handling. Use only in well ventilated area. Avoid all contact with eyes, skin and clothing. Do not inhale dusts. Keep away from all unprotected persons and children. Do not use near sources of heat, flame or direct sunlight. Chlorpyrifos should never be heated above 131°F / 55°C and also local heating above this temperature should be avoided. Keep away from alkalis 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, dry, well ventilated area away from incompatibles. Product is stable when stored in coated, unopened drums at temperatures not exceeding 68 - 77°F / 20 - 25°C. Protect container from physical damage. No smoking in the area. Inspect containers periodically for damage or leaks.

**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. Wear a pesticide respirator jointly approved by the MSHA and NIOSH. Advice should be sought from respiratory protection specialists.

**Protective gloves:** Wear impervious chemical gloves, such as barrier laminate, butyl rubber, nitrile rubber or viton. Advice should be sought from glove suppliers.

**Eye protection:** Wear safety glasses with side shields or chemical splash goggles to prevent dusts from entering the eyes.

**Other protective equipment:** Wear appropriate protective clothing (coveralls or long sleeved shirt, and long pants) 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 breathe dusts. 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. Respirator should be cleaned and filter replaced according to manufacturer's instructions. Wear only clean, uncontaminated clothes when leaving place of work. Persons working with this product for a longer period should have frequent blood tests for cholinesterase levels. If the cholinesterase levels fall below a critical point, no further exposure should be allowed until it has been determined, by means of blood tests, that cholinesterase levels have returned to normal.

## SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

**Physical state, odor and appearance:** Light brown, granular solid, slightly aromatic odor.

**Odor threshold:** N/Av

**Specific gravity (water = 1):** Pour density: 0.72 mg/L @ 68°F / 20°C.  
Tap density: 0.80 mg/L @ 68°F / 20°C

**Solubility in water:** 0.94 mg/L @ 77°F / 25°C (Chlorpyrifos).

**pH:** N/Av

**Melting/freezing point:** N/Av.

**Boiling point:** N/Av.

**Vapour pressure:** 1.87 x 10<sup>-5</sup> mmHg @ 77°F / 25°C (Chlorpyrifos).  
8.15 x 10<sup>-5</sup> mmHg @ 95°F / 35°C (Chlorpyrifos).

**Vapour density (Air=1.0):** N/Av

**Percent Volatile by Weight:** N/Av

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

**Coefficient of n-Octanol/water distribution:** log K<sub>ow</sub> (log P) = 4.700 (Chlorpyrifos).

**Solubility in organic solvents:** N/Av.

## SECTION 10 — REACTIVITY AND STABILITY DATA

**Stability and reactivity:** Stable if handled below 131°F / 55°C. At higher temperatures decomposition may take place. The released heat from decomposition can raise the temperature further and accelerate decomposition. This product can corrode mild steel.

## SECTION 10 — REACTIVITY AND STABILITY DATA CONTINUED

**Hazardous polymerization:** Above 320°F / 160°C Chlorpyrifos will decompose rapidly, significantly increasing the risk of inducing explosions. The decomposition is to a considerable extent dependant on time as well as temperature due to exothermic and autocatalytic reactions. The reactions involve rearrangements and polymerisation releasing volatile, malodorous and inflammable compounds such as diethyl sulfide.

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

**Materials to avoid (incompatibles):** Strong alkalis, amines and strong oxidizing compounds.

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

## SECTION 11 — TOXICOLOGICAL INFORMATION

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

**Toxicological data:** LC<sub>50</sub> (mg/L/4 hrs) = >2.0

LD<sub>50</sub>, oral, rat (mg/kg) = 2073

LD<sub>50</sub>, dermal, rat (mg/kg) = >2000

**Carcinogenicity:** This product contains Crystalline silica which is classified as carcinogenic by IARC (Group 1 - when inhaled through occupational sources), ACGIH (Group A2 – in the respirable form), OSHA (OSHA Select carcinogen) and NTP (Group 2 – in the respirable form). However, Crystalline silica is classified as carcinogenic by IARC, ACGIH, OSHA and NTP as causing cancer only when it's particles are airbourne and of a respirable or inhalable size. Airbourne respirable particles are not expected for this product, based on the intended use and form of the product as a whole.

**Teratogenicity, mutagenicity, other reproductive effects:** None observed in test animals.

**Sensitization to material:** None known.

**Synergistic materials:** Not available.

**Conditions aggravated by exposure:** Repeated exposures to cholinesterase inhibitors, such as Chlorpyrifos, may without warning cause increased susceptibility to doses of any cholinesterase inhibitor.

## SECTION 12 — ECOLOGICAL INFORMATION

**Chemical fate information:** The active ingredient, Chlorpyrifos, is readily biodegradable. It undergoes rapid degradation in the environment and, without problems, in sewage treatment plants. No adverse effects are observed at concentrations up to 100 mg/L in waste water treatment plants. Degradation occurs both aerobically and anaerobically, and biologically as well as abiologically. Chlorpyrifos is not mobile in soil, but is strongly absorbed to soil. The product, therefore, 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.

**Ecotoxicological information:** Chlorpyrifos is toxic to birds, fish and aquatic invertebrates. The acute toxicity is:

Fish – 96-Hr LC<sub>50</sub>, Rainbow trout (*Salmo gairdneri*) = 3 µg/L.

Invertebrates – 48-Hr LC<sub>50</sub>, Daphnids (*Daphnia magna*) = 1.7 µg/L.

Birds – LD<sub>50</sub>, Bobwhite quail (*Colinus virginianus*) = 13.3 mg/kg.

LD<sub>50</sub>, Mallard duck (*Anas platyrhynchos*) = 75.6 mg/kg

Bees - LD<sub>50</sub>, Honey-bees (*Apis mellifera*), acute oral = 0.36 µg/bee.

LD<sub>50</sub>, Honey-bees (*Apis mellifera*), topical = 0.070 µg/bee

## 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. Completely empty bag into application equipment, then dispose of in a sanitary landfill or by incineration, or if allowed by state and local authorities, by burning. If burned, stay out of smoke. Disposal must be in accordance with all applicable federal, state and local regulations. Contact your local, state or federal environmental agency for specific rules.

## SECTION 14 — TRANSPORTATION INFORMATION

### 49 CFR information:

*Proper Shipping Name:* Environmentally hazardous substances, solid, n.o.s. (Chlorpyrifos).

*Primary Hazard Class:* 9.

*Label Codes:* 9.

*Identification Number:* UN3077

*Packing Group:* III.

*Reportable Quantity:* 1 lb

*Marine Pollutant:* Severe (PP).

**Canadian Transportation of Dangerous Goods Clear Language (CLR) information:** Not regulated for transport, unless intended for Marine transport. If this product is intended for marine transport, refer to the following information:

*Shipping description:* ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Chlorpyrifos), Class 9, UN3077, PGIII.

## 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 D2A** (*Materials causing other toxic effects, Very Toxic Material*); **Class F** (*Dangerously Reactive 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.***

### United States:

**California Proposition 65 information:** This product contains Crystalline silica (CAS # 14808-60-7), which is known to the state of California to cause cancer. However, Crystalline silica is listed on Proposition 65 as causing cancer only when it's particles are airbourne and of a respirable size. Airbourne respirable particles are not expected for this product, based on the intended use and form of the product as a whole.

**EPA/CERCLA Reportable Quantity (RQ):** 1 lb. (Chlorpyrifos).

**SARA TITLE III:** *Sec. 313, Toxic Chemicals Notification, 40 CFR 372:* This material is not known to contain any Toxic Chemical constituents.

## SECTION 16 — OTHER INFORMATION

**HMIS Rating:** \*1 Health; 1 Flammability; 1 Reactivity

**Legend:** ACGIH – American Conference of Governmental Industrial Hygienists

CAS - Chemical Abstract Service

CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act of 1980

CFR – Code of Federal Regulations

EPA – Environmental Protection Agency

HMIS – Hazardous Materials Identification System

IARC – International Agency for Research on Cancer

Inh – Inhalation

MSHA – Mine Safety and Health Administration

N/Ap – Not Applicable

N/Av – Not Available

NIOSH – National Institute for Occupational Safety and Health

NTP – National Toxicology Program

OEHHA – Office of Environmental Health Hazard Assessment

OSHA – Occupational Safety and Health Act

PEL - Permissible Exposure Limit

PMCC – Pensky Martins Closed Cup

SARA - Superfund Amendments & Reauthorization Act

TLV – Threshold Limit Value

TSCA – Toxic Substances Control Act

TWA - Time Weighted Average

WHMIS – Workplace Hazardous Materials Information System

**SECTION 16 — OTHER INFORMATION CONTINUED**

**References:**

1. ACGIH, Threshold Limit Values and Biological Exposure Indices for 2003.
2. Canadian Centre for Occupational Health and Safety, CCInfoWeb databases, 2003 (Chempendium and RTECs).
3. Material Safety Data Sheet from manufacturer.
4. International Agency for Research on Cancer Monographs, Supplement 7, 1988.
5. US EPA Title III List of Lists – October 2001 version.
6. California's OEHHA Proposition 65 List – July 11, 2003 version.

**Prepared by:** Cheminova Inc.

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

**Preparation date:** August 19, 2003

**Revision date:** January 16, 2004

**Revision reasons:**

1. Ingredient concentration ranges changed, Section 2.
2. 49 CFR information updated, Section 14.
3. Abbreviations updated, Section 16.