



## 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**Product Name:** Nufarm Double O™ SPC Herbicide

**EPA Reg. No.:** 228-632

**Product Type:** Herbicide

**Company Name:** Nufarm Americas Inc.  
11901 S. Austin Avenue  
Alsip, IL 60803  
1-800-345-3330

**Telephone Numbers:** For Chemical Emergency, Spill, Leak, Fire, Exposure, or Accident,  
Call CHEMTREC Day or Night: 1-800-424-9300  
For Medical Emergencies Only, Call 1-877-325-1840

This product is an EPA FIFRA registered pesticide. Some classifications on this SDS are not exactly the same as on the FIFRA label. Certain sections are superseded by federal law governed by EPA for a registered pesticide. Please see Section 15. REGULATORY INFORMATION for explanation.

## 2. HAZARDS IDENTIFICATION

**PHYSICAL HAZARDS:**

Not hazardous

**HEALTH HAZARDS:**

Eye Irritation	Category 2B
Carcinogen	Category 1A
Reproductive Toxicity	Category 1B
Specific Target Organ Toxicity – Repeated Exposure	Category 1

**ENVIRONMENTAL HAZARDS:**

Hazardous to aquatic environment, acute	Category 2
Hazardous to aquatic environment, chronic	Category 2

**SIGNAL WORD:**

DANGER

**HAZARD STATEMENTS:**

Causes eye irritation. May cause cancer by inhalation. Causes damage to lungs through prolonged or repeated inhalation. May damage the unborn child through ingestion. Toxic to aquatic life with long lasting effects.



**PRECAUTIONARY STATEMENTS:**

Obtain special instructions before use. Do not handle until safety precautions have been read and understood. Do not breathe dust. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use personal protective equipment as required. Avoid release to the environment.

IF exposed or concerned: Get medical advice.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice.

Collect spillage.

Store locked up.

Dispose of contents in accordance with local, state, and federal regulations.

### 3. COMPOSITION / INFORMATION ON INGREDIENTS

COMPONENTS	CAS NO.	% BY WEIGHT
Oxyfluorfen	42874-03-3	1.9 – 2.1
Oryzalin	19044-88-3	0.9 – 1.1
N-methyl-2-pyrrolidone	872-50-4	4.7 – 5.2
Montmorillonite	1302-78-9	80 – 90
Crystalline silica (quartz)	14808-60-7	6.2 – 9.5

**Synonyms:** Mixture containing oxyfluorfen (2-chloro-1-(3-ethoxy-4-nitrophenoxy)-4-(trifluoromethyl)benzene) and oryzalin (4-(dipropylamino)-3,5-dinitrobenzenesulfonamide)

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

### 4. FIRST AID MEASURES

**If in Eyes:** Hold eye open and rinse slowly and gently with water for several minutes. Remove contact lenses, if present, then continue rinsing eye. Get medical attention if irritation occurs.

**If Swallowed:** Call a poison control center or doctor for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor. Do not give anything by mouth to an unconscious person.

**If on Skin or Clothing:** Take off contaminated clothing. Wash with soap and water. If irritation develops, get medical attention.

**If Inhaled:** Move person to fresh air. Get medical attention if symptoms develop.

**Most important symptoms/effects, both acute and delayed:** Skin exposure may result in slight irritation. Eye exposure may result in moderate irritation. May cause lung damage or cancer through prolonged or repeated inhalation. May cause damage to the unborn child through ingestion.

**Indication of immediate medical attention and special treatment if needed:** Immediate medical attention is not expected.

### 5. FIRE FIGHTING MEASURES

**Extinguishing Media:** Use extinguishing media suitable for surrounding materials. Dry chemical, carbon dioxide, foam, water spray or fog.

**Special Fire Fighting Procedures:** Firefighters should wear NIOSH approved self-contained breathing apparatus and full fire-fighting turn out gear. Dike area to prevent runoff and contamination of water sources. Dispose of fire control water later.

**Unusual Fire and Explosion Hazards:** If water is used to fight fire, contain runoff, using dikes to prevent contamination of water supplies. Dispose of fire control water later

**Hazardous Decomposition Materials (Under Fire Conditions):** May produce gases such as oxides of carbon and nitrogen.

### 6. ACCIDENTAL RELEASE MEASURES

**Personal Precautions:** Wear appropriate protective gear for the situation. See Personal Protection information in Section 8.

**Environmental Precautions:** Prevent material from entering public sewer systems or any waterways. Do not flush to drain. Large spills to soil or similar surfaces may necessitate removal of topsoil. The affected area should be removed and placed in an appropriate container for disposal.

**Methods for Containment:** Dike spill using absorbent or impervious materials such as earth, sand or clay. Collect and contain contaminated absorbent and dike material for disposal.

**Methods for Cleanup and Disposal:** Avoid creation of dusty conditions. If dry, sweep or scoop up material and place into container for disposal. If wet, pump any free liquid into an appropriate closed container. Decontaminate tools and equipment following cleanup. See Section 13: DISPOSAL CONSIDERATIONS for more information.

**Other Information:** Large spills may be reportable to the National Response Center (800-424-8802) and to state and/or local agencies.

## 7. HANDLING AND STORAGE

**Handling:**

Avoid contact with skin, eyes or clothing. Users should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet. Remove clothing/Personal Protective Equipment (PPE) immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

**STORAGE:**

Store in a cool, dry place and in such a manner as to prevent cross-contamination with other pesticides, fertilizers, food and feed. Store in original container and out of the reach of children, preferably in a locked storage area. Do not contaminate water, food, or feed by storage or disposal. Handle and open container in a manner as to prevent spillage. If the container is leaking or material is spilled for any reason or cause, carefully sweep material into a pile. Refer to Precautionary Statements on label for hazards associated with the handling of this material. Do not walk through spilled material. Dispose of as directed for pesticides above, or apply uncontaminated product according to Directions For Use. Keep unauthorized people away.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

**Engineering Controls:**

Where engineering controls are indicated by specific use conditions or a potential for excessive exposure, use local exhaust ventilation at the point of generation.

**Personal Protective Equipment:**

**Eye/Face Protection:** Not normally required. To avoid contact with eyes, wear chemical goggles or shielded safety glasses. An emergency eyewash or water supply should be readily accessible to the work area.

**Skin Protection:** To avoid contact with skin, wear coveralls over long-sleeved shirt and long pants, chemical-resistant footwear plus socks, and chemical resistant gloves. Wear a chemical-resistant apron when mixing or loading. An emergency shower or water supply should be readily accessible to the work area.

**Respiratory Protection:** Not normally required. If vapors or mists exceed acceptable levels, wear NIOSH approved air-purifying respirator with cartridges/canisters approved for use against pesticides.

**General Hygiene Considerations:** Personal hygiene is an important work practice exposure control measure and the following general measures should be taken when working with or handling this material:

- 1) do not store, use and/or consume foods, beverages, tobacco products, or cosmetics in areas where this material is stored;
- 2) wash hands and face carefully before eating, drinking, using tobacco, applying cosmetics or using the toilet.

**Exposure Guidelines:**

Component	OSHA		ACGIH		Units
	TWA	STEL	TWA	STEL	
Oxyfluorfen	NE	NE	NE	NE	
Oryzalin	NE	NE	NE	NE	
N-methyl-2- pyrrolidone	NE	NE	NE	NE	
Montmorillonite	NE	NE	NE	NE	
Crystalline silica (quartz)	30 / %SiO <sub>2</sub> +2 (T) 10 / %SiO <sub>2</sub> +2 (R)	NE	0.025 (R)	NE	mg/m <sup>3</sup>

NE = Not Established

T= Total Dust

R= Respirable Fraction

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance:</b>	Yellow colored granules
<b>Odor:</b>	Slight odor
<b>Odor threshold:</b>	No data available
<b>pH:</b>	8.98 (1% w/w dispersion in DIW)
<b>Melting point/freezing point:</b>	No data available
<b>Initial boiling point and boiling range</b>	No data available
<b>Flash point:</b>	No data available
<b>Evaporation rate:</b>	No data available

## SAFETY DATA SHEET

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<b>Flammability (solid, gas):</b>	No data available
<b>Upper/lower flammability or explosive limits:</b>	No data available
<b>Vapor pressure:</b>	No data available
<b>Vapor density:</b>	No data available
<b>Relative density:</b>	0.663 g/ml (pour) 0.700 g/ml (tap)
<b>Solubility(ies):</b>	Relatively insoluble
<b>Partition coefficient: n-octanol/water:</b>	No data available
<b>Autoignition temperature:</b>	No data available
<b>Decomposition temperature:</b>	No data available
<b>Viscosity:</b>	No data available

**Note:** Physical data are typical values, but may vary from sample to sample. A typical value should not be construed as a guaranteed analysis or as a specification.

### 10. STABILITY AND REACTIVITY

**Reactivity:** Not reactive.

**Chemical Stability:** This material is stable under normal handling and storage conditions.

**Possibility of Hazardous Reactions:** Will not occur.

**Conditions to Avoid:** Excessive heat. Do not store near heat or flame.

**Incompatible Materials:** Strong oxidizing agents: bases and acids.

**Hazardous Decomposition Products:** Under fire conditions, may produce gases such as hydrogen chloride, hydrogen cyanide, and oxides of carbon and nitrogen.

### 11. TOXICOLOGICAL INFORMATION

**Likely Routes of Exposure:** Inhalation, skin and eye contact.

**Symptoms of Exposure:**

**Eye Contact:** Moderately irritating based on toxicity studies.

**Skin Contact:** Mildly toxic and slightly irritating based on toxicity studies.

**Ingestion:** Slightly toxic if ingested based on toxicity studies. Ingestion may damage the unborn child.

**Inhalation:** Low inhalation toxicity based on toxicity studies. May cause lung damage or lung cancer through repeated inhalation.

**Delayed, immediate and chronic effects of exposure:** Prolonged or repeated inhalation may cause lung damage or lung cancer. May damage the unborn child through ingestion..

**Toxicological Data:**

Data from laboratory studies conducted are summarized below:

**Oral:** Rat LD<sub>50</sub>: > 5,000 mg/kg (female)

**Dermal:** Rat LD<sub>50</sub>: >5,000 mg/kg

**Inhalation:** Rat 4-hr LC<sub>50</sub>: >2.03 mg/l (no mortalities at highest dose tested)

**Eye Irritation:** Rabbit: Moderately irritating (MMTS= 28.7)

**Skin Irritation:** Rabbit: Slightly irritating (PDII= 0.4)

**Skin Sensitization:** Not a contact sensitizer in guinea pigs following repeated skin exposure.

**Subchronic (Target Organ) Effects:** Repeated high dose exposure to oxyfluorfen may affect blood, kidney, liver, spleen and adrenals. For oryzalin, repeated high dose exposure may cause hematological and clinical chemistry effects, increased weight of several organs and bone marrow effects. Similarly, repeated high dose exposure to N Methyl 2-pyrrolidinone (NMP) may cause effects to eyes, skin, respiratory system, central nervous system, liver and kidneys.

**Carcinogenicity / Chronic Health Effects:** High dose exposure to oxyfluorfen may affect blood and liver. In a mouse carcinogenicity study, oxyfluorfen showed combined hepatocellular adenomas/ carcinomas. For oryzalin, long-term and life-time high dose exposure can cause similar effects as stated above for subchronic effects and effects to the thyroid. In addition, at these high dose levels decreased survival rats were observed in rats. In mice lifetime feeding study, oryzalin has been shown not to be carcinogenic. In rat life-time feeding study, oryzalin has been shown to cause an increase occurrence of mammary gland tumors in females and skin and thyroid tumors in both sexes. Oryzalin is classified as a Group C Carcinogen (limited evidence of carcinogenicity in animals). Oryzalin is not listed as a carcinogen by IRAC, NTP, OSHA, or ACGIH. This product contains crystalline silica (e.g. quartz), a naturally occurring component. Inhalation of crystalline silica may cause pulmonary fibrosis (silicosis). Crystalline silica has been classified by IARC as carcinogenic to humans (Group 1), by the U.S. National Toxicology Program as a known human carcinogen and by ACGIH as a suspected human carcinogen (A2).

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Concerning NMP, no increase in tumors was seen in rats via dietary or inhalation exposure for two years; however, an increase in liver tumors was noted in mice receiving high dietary doses over a similar period. Liver tumors are not uncommon when non-genotoxic chemicals such as NMP are tested in the mouse bioassay at very high doses.

**Reproductive Toxicity:** In laboratory animal studies for oxyfluorfen, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals. Similarly, oryzalin was not a primary reproductive toxicant in a multi-generation reproduction study in rats. Reproductive effects were observed only at doses that caused systemic toxicity in adult rats. NMP at high doses may adversely affect reproduction in rats after ingestion, although fertility is unaltered.

**Developmental Toxicity:** Oxyfluorfen did not cause birth defects in laboratory animals. However, oxyfluorfen produced fetal effects in laboratory animals at high doses that caused maternal toxicity. Oryzalin was not a primary developmental toxicant in rats and rabbits. Development effects were observed but were considered secondary to material toxicity. For NMP, fetal developmental effects were observed following ingestion, inhalation and dermal exposures in pregnant animals, and occurred both in the presence and absence of maternal toxicity.

**Genotoxicity:** *In vitro* and animal genetic toxicity studies for both oxyfluorfen and oryzalin were negative. Neither *in vitro* nor *in vivo* tests on NMP demonstrated mutagenic effects.

### Assessment Carcinogenicity:

This product contains substances that are considered to be probable or suspected human carcinogens as follows:

Component	Regulatory Agency Listing As Carcinogen			
	ACGIH	IARC	NTP	OSHA
Oxyfluorfen	No	No	No	No
Oryzalin	No	No	No	No
N-methyl-2-pyrrolidone	No	No	No	No
Montmorillonite	No	No	No	No
Crystalline silica (quartz)	A2	1A	Known	No

## 12. ECOLOGICAL INFORMATION

### Ecotoxicity:

Data on Oxyfluorfen Technical:

96-hour LC50 Bluegill:	0.20 mg/L	Bobwhite Quail 8-day Dietary LC50:	390 ppm
96-hour LC50 Rainbow Trout:	0.41 mg/L	Bobwhite Quail Oral LD50:	>2,000 mg/kg
96-hour LC50 Channel Catfish:	0.40 mg/L	Mallard Duck 8-day Dietary LC50:	>4,000 ppm
Honey Bee Contact LD50:	>100 ug/bee		

Data on Oryzalin Technical:

96-hour LC50 Bluegill Sunfish:	2.88 ppm	Bobwhite Quail Oral LD50:	506 mg/kg
96-hour LC50 Rainbow Trout:	3.26 ppm	Bobwhite Quail 8-day Dietary LC50:	> 5000 ppm
48-hour LC50 Daphnia Magna:	1.4 ppm	Mallard Duck 8-day Dietary LC50:	> 5000 ppm
Honey Bee Contact LD50:	11 ug/bee		

### Environmental Fate:

Oxyfluorfen is persistent and relatively immobile in soil. The most likely route of dissipation is soil binding. Absorption increases as soil organic content increases. Microbial degradation and hydrolysis are not methods of soil degradation for oxyfluorfen. Because oxyfluorfen is nearly insoluble in water and has a tendency to adsorb to soil, it is unlikely to remain in water. It will instead adsorb to suspended particles or sediments. However, oxyfluorfen may degrade by photolysis in clear, shallow water.

Oryzalin has low solubility in water and it does not have a strong tendency to adsorb to soil particles. Degradation is expected in the soil environment within days to weeks. Its representative soil half-life is 20 days. There was no observed breakdown of oryzalin via hydrolysis from pH 5 to 9. It leaches downward in soils with low organic matter and clay content to a limited extent with rainfall and thus, has a moderate potential to contaminate groundwater. Microbial degradation may be responsible for the breakdown of oryzalin in soils. It is subject to photodecomposition, but not volatilization, at the soil surface.

## 13. DISPOSAL CONSIDERATIONS

### Waste Disposal Method:

Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility. Improper disposal of excess pesticide is a violation of Federal law.

**Container Handling and Disposal:**

Nonrefillable container. Do not reuse or refill this container. Offer for recycling, if available. Completely empty bag into application equipment. Then dispose of empty bag in a sanitary landfill or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

**14. TRANSPORTATION INFORMATION****DOT****< 882 pounds per completed package:**

Non Regulated

**≥882 pounds per completed package:**

UN 3077, Environmentally hazardous substance, solid, n.o.s., (Oxyfluorfen, Oryzalin), 9, III, Marine Pollutant

**IMDG**

UN 3077, Environmentally hazardous substance, solid, n.o.s., (Oxyfluorfen, Oryzalin), 9, III, Marine Pollutant

**IATA****< 882 pounds per completed package:**

Non Regulated

**≥882 pounds per completed package:**

UN 3077, Environmentally hazardous substance, solid, n.o.s., (Oxyfluorfen, Oryzalin), 9, III, Marine Pollutant

**15. REGULATORY INFORMATION****EPA FIFRA INFORMATION**

This chemical is a pesticide product registered by the United States Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS), and for workplace labels of non-pesticide chemicals. The hazard information required on the pesticide label is reproduced below. The pesticide label also includes other important information, including directions for use.

CAUTION. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum or using tobacco.

**U.S. FEDERAL REGULATIONS**

**TSCA Inventory:** This product is exempted from TSCA because it is solely for FIFRA regulated use.

**SARA Hazard Notification/Reporting:****Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370):**

Acute Health, Chronic Health

**Section 313 Toxic Chemical(s):**

Oxyfluorfen (CAS No. 42874-03-3)

Oryzalin (CAS No. 19044-88-3)

N-methyl-2-pyrrolidone (CAS No. 872-50-4)

**Reportable Quantity (RQ) under U.S. CERCLA:**


None

**RCRA Waste Code:**

Under RCRA, it is the responsibility of the product user to determine at the time of disposal, whether a material containing the product or derived from the product should be classified as a hazardous waste.

**State Information:**

Other state regulations may apply. Check individual state requirements.

**California Proposition 65:**  **ATTENTION.** This product can expose you to chemicals including oryzalin and silica, crystalline which are known to the state of California to cause cancer; and oxadiazon which is known to the State of California to cause birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

**16. OTHER INFORMATION****National Fire Protection Association (NFPA) Hazard Rating:****Rating for this product: Health: 1 Flammability: 1 Reactivity: 0**

Hazards Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

This Safety Data Sheet (SDS) serves different purposes than and DOES NOT REPLACE OR MODIFY THE EPA-ACCEPTED PRODUCT LABELING (attached to and accompanying the product container). This SDS provides important health, safety and environmental information for employers, employees, emergency responders and others handling large quantities of the product in activities generally other than product use, while the labeling provides that information specifically for product use in the ordinary course.

Use, storage and disposal of pesticide products are regulated by the EPA under the authority of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) through the product labeling, and all necessary and appropriate precautionary, use, storage, and disposal information is set forth on that labeling. It is a violation of Federal law to use a pesticide product in any manner not prescribed on the EPA-accepted label.

Although the information and recommendations set forth herein (hereinafter "Information") are presented in good faith and believed to be correct as of the date hereof, Nufarm Americas Inc. makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will Nufarm Americas Inc. be responsible for damages of any nature whatsoever resulting from the use of or reliance upon Information. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS AND ALL SUCH WARRANTIES ARE HEREBY SPECIFICALLY DISCLAIMED.

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