

## BRAVO® ZN

Date: 5/12/2017  
Replaces: 3/18/2017

### 1. PRODUCT IDENTIFICATION

Product identifier on label: **BRAVO® ZN**  
Product No.: A7867G  
Use: Fungicide  
Manufacturer: Syngenta Crop Protection, LLC  
Post Office Box 18300  
Greensboro NC 27419  
Manufacturer Phone: 1-800-334-9481

**Emergency Phone: 1-800-888-8372**

### 2. HAZARDS IDENTIFICATION

Classifications: Inhalation: Category 4  
Skin Sensitizer: Category 1B  
Carcinogenicity: Category 2  
Eye Damage/Irritation: Category 2A  
Specific Target Organ Toxicity: Respiratory Irritation Category 3

Signal Word (OSHA): Warning

Hazard Statements: May cause an allergic skin reaction  
Causes serious eye irritation  
Harmful if inhaled  
May cause respiratory irritation  
Suspected of causing cancer

Hazard Symbols:



Precautionary Statements: Avoid breathing mist, vapors, spray.  
Wash hands and face thoroughly after handling.  
Wear eye protection.  
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.  
Obtain special instructions before use.  
Do not handle until all safety precautions have been read and understood.  
Use only outdoors or in a well-ventilated area.  
Contaminated work clothing must not be allowed out of the workplace.

## BRAVO® ZN

Date: 5/12/2017  
Replaces: 3/18/2017

Wear protective gloves, protective clothing, eye protection.  
If on skin: Wash with plenty of soap and water.  
If skin irritation or rash occurs: Get medical advice.  
If inhaled: Remove person to fresh air and keep comfortable for breathing.  
If exposed or concerned: Get medical advice/attention.  
Call a poison center, doctor or Syngenta if you feel unwell.  
Store locked up.  
Dispose of contents and container in accordance with local regulations.

Other Hazard Statements: None

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Common Name	CAS Number	Concentration
1,2-Propanediol	Propylene Glycol	57-55-6	Trade Secret
Silica, amorphous	Silica, amorphous	112926-00-8	Trade Secret
Zinc Oxide	Zinc Oxide	1314-13-2	< 6%
Other ingredients	Other ingredients	Trade Secret	> 55.5%
Tetrachloroisophthalonitrile	Chlorothalonil	1897-45-6	38.5%

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

### 4. FIRST AID MEASURES

Have the product container, label or Safety Data Sheet with you when calling Syngenta (800-888-8372), a poison control center or doctor, or going for treatment.

**Ingestion:** If swallowed: Call Syngenta (800-888-8372), a poison control center or doctor immediately for treatment advice. Do not give any liquid to the person. Do not induce vomiting unless told to do so after calling 800-888-8372 or by a poison control center or doctor. Do not give anything by mouth to an unconscious person.

**Eye Contact:** If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after 5 minutes, then continue rinsing eye. Call Syngenta (800-888-8372), a poison control center or doctor for treatment advice.

**Skin Contact:** If on skin or clothing: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call Syngenta (800-888-8372), a poison control center or doctor for treatment advice.

**Inhalation:** If inhaled: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call Syngenta (800-888-8372), a poison control center or doctor for further treatment advice.

Most important symptoms/effects:

Skin irritation  
Allergic skin reaction  
Respiratory irritation

Indication of immediate medical attention and special treatment needed:

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

## BRAVO® ZN

Date: 5/12/2017

Replaces: 3/18/2017

Persons suffering a temporary allergic reaction may respond to treatment with antihistamines or steroid creams and/or systemic steroids.

### 5. FIRE FIGHTING MEASURES

Suitable (and unsuitable) extinguishing media:

Use dry chemical, foam or CO2 extinguishing media. If water is used to fight fire, dike and collect runoff.

Specific Hazards:

During a fire, irritating and possibly toxic gases may be generated by thermal decomposition or combustion.

Special protective equipment and precautions for firefighters:

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.

### 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment, and emergency procedures:

Follow exposure controls/personal protection outlined in Section 8.

Methods and materials for containment and cleaning up:

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 Section 8. Cover entire spill with absorbing material and place into compatible disposal container. Scrub area with hard water detergent (e.g. commercial products such as Tide, Joy, Spic and Span). Pick up wash liquid with additional absorbent and place into compatible disposal container. Once all material is cleaned up and placed in a disposal container, seal container and arrange for disposition.

### 7. HANDLING AND STORAGE

Precautions for safe handling:

Store the material in a well-ventilated, secure area out of reach of children and domestic animals. Do not store food, beverages or tobacco products in the storage area. Prevent eating, drinking, tobacco use, and cosmetic application in areas where there is a potential for exposure to the material. Wash thoroughly with soap and water after handling.

Conditions for safe storage, including any incompatibilities:

Store locked up.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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

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

Occupational Exposure Limits:

Chemical Name	OSHA PEL	ACGIH TLV	Other	Source
Propylene Glycol	Not Established	Not Established	10 mg/m <sup>3</sup> TWA	AIHA
Silica, amorphous	80 mg/m <sup>3</sup> /% SiO <sub>2</sub> TWA	Not Established	6 mg/m <sup>3</sup> TWA	NIOSH
Zinc Oxide	15 mg/m <sup>3</sup> TWA (total dust); 5 mg/m <sup>3</sup> TWA (respirable)	2 mg/m <sup>3</sup> TWA (total dust); 10 mg/m <sup>3</sup> STEL (respirable)	5 mg/m <sup>3</sup> TWA (dust); 15 mg/m <sup>3</sup> Ceiling	NIOSH
Other ingredients	Not Established	Not Established	Not Established	Not Applicable

## BRAVO® ZN

Date: 5/12/2017  
 Replaces: 3/18/2017

Chlorothalonil	Not Established	Not Established	0.1 mg/m <sup>3</sup> TWA	Syngenta
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Appropriate engineering controls:

Use effective engineering controls to comply with occupational exposure limits (if applicable).

Individual protection measures:

**Ingestion:**

Prevent eating, drinking, tobacco usage and cosmetic application in areas where there is a potential for exposure to the material. Wash thoroughly with soap and water after handling.

**Eye Contact:**

Where eye contact is likely, use chemical splash goggles.

**Skin Contact:**

Where contact is likely, wear chemical-resistant gloves (such as barrier laminate, butyl rubber, nitrile rubber, neoprene rubber, natural rubber, polyethylene, polyvinyl chloride [PVC] or Viton), coveralls, socks and chemical-resistant footwear.

**Inhalation:**

A respirator is not normally required when handling this substance. Use effective engineering controls to comply with occupational exposure limits.

In case of emergency spills, use a NIOSH certified respirator with any N, R, P or HE filter.

### 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Gray viscous suspension

Odor: Slight

Odor Threshold: Not Available

pH: 7.5 - 9.5

Melting point/freezing point: Not Applicable

Initial boiling point and boiling range: 212 °F

Flash Point (Test Method): Not Available

Flammable Limits (% in Air): Not Applicable

Flammability: Not Applicable

Vapor Pressure: Chlorothalonil 0.00000057mmHg @ 77°F (25°C)

Vapor Density: Not Available

Relative Density: 1.28 g/ml (water = 1)

Solubility (ies): Chlorothalonil 0.81 mg/l @ 77°F (25°C)

Partition coefficient: n-octanol/water: Not Applicable

Autoignition Temperature: Not Applicable

Decomposition Temperature: Not Available

Viscosity: Not Available

Other: None

## BRAVO® ZN

Date: 5/12/2017

Replaces: 3/18/2017

**10. STABILITY AND REACTIVITY**

Reactivity: Not reactive.

Chemical stability: Stable under normal use and storage conditions.

Possibility of hazardous reactions: Material is not known to polymerize.

Conditions to Avoid: None known.

Incompatible materials: None known.

Hazardous Decomposition Products: None known.

**11. TOXICOLOGICAL INFORMATION**Health effects information

Likely routes of exposure: Dermal, Inhalation

Symptoms of exposure: Eye irritation, Skin irritation, Respiratory irritation

Delayed, immediate and chronic effects of exposure: Possible carcinogenicity, Eye irritation, Skin irritation, Allergic skin reaction, Respiratory system effects

Numerical measures of toxicity (acute toxicity/irritation studies (finished product))

Ingestion: Oral (LD50 Rat) : 3750 mg/kg body weight

Dermal: Dermal (LD50 Rabbit) : &gt; 2000 mg/kg body weight

Inhalation: Inhalation (LC50 Rat) : 0.25 mg/l air - 4 hours

Eye Contact: Mildly Irritating (Rabbit)

Skin Contact: Moderately Irritating (Rabbit)

Skin Sensitization: A moderate skin sensitizer in animal tests.

Reproductive/Developmental Effects

Chlorothalonil: Did not show reproductive toxicity effects in animal experiments. Did not show teratogenic effects in animal experiments.

Chronic/Subchronic Toxicity Studies

Chlorothalonil: In dogs, 1 year administration caused a significant decrease in body weight gain and increases in absolute liver and kidney weights.

Neurotoxicity: No evidence in regulatory studies.

Carcinogenicity

Chlorothalonil: Chlorothalonil causes kidney tumors in rats and mice via a nongentoxic mode of action secondary to target organ toxicity.

Did not show mutagenic effects in animal experiments.

IARC identifies chlorothalonil as a 2B carcinogen (possibly carcinogenic to humans).

Chemical Name	NTP/IARC/OSHA Carcinogen
1,2-Propanediol	No

## BRAVO® ZN

Date: 5/12/2017  
Replaces: 3/18/2017

Silica, amorphous	IARC Group 3
Zinc Oxide	No
Other ingredients	No
Tetrachloroisophthalonitrile	IARC Group 2B

Other Toxicity Information

Studies on rats and mice have suggested that technical chlorothalonil (97%), when fed at high levels in the diet, may have oncogenic potential to these laboratory animals. However, neither chlorothalonil nor its metabolites interact with DNA and thus are not mutagenic. Tumor formation has been related to a non-genotoxic mechanism of action for which threshold levels have been established in rats and mice. Comprehensive dietary and worker exposure studies have shown exposure levels for humans to be well below these threshold levels. In addition, surveillance of chlorothalonil plant workers for over twenty years has not demonstrated any increase in oncogenic potential to humans.

Toxicity of Other Components

Other ingredients  
Not Established

## Propylene Glycol

Reported to cause central nervous system depression (anesthesia, dizziness, confusion), headache and nausea. Also, eye irritation may occur with lacrimation but no residual discomfort or injury. Prolonged contact to skin may cause mild to moderate irritation and possible allergic reactions. Chronic dietary exposure caused kidney and liver injury in experimental animals.

## Silica, amorphous

Dusts in high concentrations may cause skin, eye and respiratory tract irritation.

## Zinc Oxide

Causes respiratory tract irritation. May cause digestive tract irritation. Causes eye and skin irritation. Inhalation of fumes may cause metal-fume fever.

Target OrgansActive Ingredients

Chlorothalonil: Lung, kidney

Inert Ingredients

Other ingredients:	Not Established
Propylene Glycol:	CNS, kidney, liver
Silica, amorphous:	Skin, eye, respiratory tract
Zinc Oxide:	Respiratory tract, digestive tract, eye, skin

**12. ECOLOGICAL INFORMATION**

## Eco-Acute Toxicity

## Chlorothalonil:

Green Algae 5-day EC50 190 ppb  
Bird (Mallard Duck) LD50 Oral > 4640 mg/kg  
Invertebrate (Water Flea) 48-hour EC50 70 ppb  
Fish (Rainbow Trout) 96-hour LC50 47 ppb

## Environmental Fate

## Chlorothalonil:

The information presented here is for the active ingredient, chlorothalonil.

## BRAVO® ZN

Date: 5/12/2017

Replaces: 3/18/2017

Low bioaccumulation potential. Not persistent in soil or water. Low mobility in soil. Sinks in water (after 24 h).

### 13. DISPOSAL CONSIDERATIONS

Disposal:

Do not reuse product containers. Dispose of product containers, waste containers, and residues according to local, state, and federal health and environmental regulations.

Characteristic Waste: Not Applicable

Listed Waste: Not Applicable

### 14. TRANSPORT INFORMATION

DOT Classification

Ground Transport - NAFTA

Non-Bulk: Not regulated

Tank Truck:

Proper Shipping Name: Environmentally Hazardous Substance, Liquid, N.O.S. (Chlorothalonil), Marine Pollutant

Hazard Class: Class 9

Identification Number: UN 3082

Packing Group: PG III

Comments

Water Transport - International

Proper Shipping Name: Environmentally Hazardous Substance, Liquid, N.O.S. (Chlorothalonil), Marine Pollutant

Hazard Class: Class 9

Identification Numbers: UN 3082

Packing Group: PG III

Air Transport

Proper Shipping Name: Environmentally Hazardous Substance, Liquid, N.O.S. (Chlorothalonil)

Hazard Class: Class 9

Identification Numbers: UN 3082

Packing Group: PG III

### 15. REGULATORY INFORMATION

Pesticide Registration:

This chemical is a pesticide product registered by the 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, and for workplace labels of non-pesticide chemicals. Following is the hazard information as required on the pesticide label:

Warning: Harmful if absorbed through skin. Harmful if inhaled. Harmful if swallowed. Causes moderate eye irritation. Avoid contact with skin, eyes, or clothing. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, or using tobacco. Wear long-sleeved shirt and long pants, socks, shoes, and chemical-resistant gloves (such as natural rubber, Selection Category A). Remove and wash contaminated clothing before reuse. Avoid breathing spray mist. Avoid contact with eyes or clothing. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

EPA Registration Number(s):

50534-204-100

EPCRA SARA Title III Classification:

Section 311/312 Hazard Classes: Acute Health Hazard

## BRAVO® ZN

Date: 5/12/2017  
 Replaces: 3/18/2017

### Chronic Health Hazard

Section 313 Toxic Chemicals: Chlorothalonil 38.5% (CAS No. 1897-45-6)  
 Zinc Oxide < 6% (CAS No. 1314-13-2)

CERCLA/SARA 304 Reportable Quantity (RQ):  
 None  
 RCRA Hazardous Waste Classification (40 CFR 261):  
 Not Applicable  
 TSCA Status:  
 Exempt from TSCA, subject to FIFRA

### 16. OTHER INFORMATION

#### NFPA Hazard Ratings

Health: 3  
 Flammability: 1  
 Instability: 0

#### HMIS Hazard Ratings

Health: 2  
 Flammability: 1  
 Physical Hazard: 0

0	Minimal
1	Slight
2	Moderate
3	Serious
4	Extreme
*	Chronic

Syngenta Hazard Category: D,S

For non-emergency questions about this product call:

1-800-334-9481

Original Issued Date: 11/12/1998  
 Revision Date: 5/12/2017 Replaces: 3/18/2017  
 Section(s) Revised: 2

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, expressed or implied, is made with respect to the information contained herein.