



# Material Safety Data Sheet

Dow AgroSciences LLC

**Product Name:** Indar 2F Fungicide

**Issue Date:** 08/23/2011

**Print Date:** 23 Aug 2011

Dow AgroSciences LLC encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

## 1. Product and Company Identification

### Product Name

Indar 2F Fungicide

### COMPANY IDENTIFICATION

Dow AgroSciences LLC  
A Subsidiary of The Dow Chemical Company  
9330 Zionsville Road  
Indianapolis, IN 46268-1189  
USA

Customer Information Number:

800-992-5994

[SDSQuestion@dow.com](mailto:SDSQuestion@dow.com)

### EMERGENCY TELEPHONE NUMBER

**24-Hour Emergency Contact:**

800-992-5994

**Local Emergency Contact:**

352-323-3500

## 2. Hazards Identification

### Emergency Overview

**Color:** White to off-white

**Physical State:** Liquid.

**Odor:** Mild

**Hazards of product:**

Toxic fumes may be released in fire situations.

### OSHA Hazard Communication Standard

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

### Potential Health Effects

**Eye Contact:** Essentially nonirritating to eyes.

**Skin Contact:** Brief contact is essentially nonirritating to skin.

**Skin Absorption:** Prolonged skin contact is unlikely to result in absorption of harmful amounts.

**Inhalation:** Mist may cause irritation of upper respiratory tract (nose and throat).

**Ingestion:** Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts.

**Aspiration hazard:** Based on available information, aspiration hazard could not be determined.

**Effects of Repeated Exposure:** For the active ingredient(s): In animals, effects have been reported on the following organs: Liver. Thyroid.

**Birth Defects/Developmental Effects:** For the active ingredient(s): Has been toxic to the fetus in laboratory animals at doses toxic to the mother.

**Reproductive Effects:** For the active ingredient(s): In animal studies, has been shown to interfere with reproduction in females.

### 3. Composition Information

Component	CAS #	Amount
Fenbuconazole	114369-43-6	23.5 %
Propylene glycol	57-55-6	4.5 %
Balance	Not available	72.0 %

### 4. First-aid measures

#### Description of first aid measures

**General advice:** If potential for exposure exists refer to Section 8 for specific personal protective equipment.

**Inhalation:** Move person to fresh air. If person is not breathing, call an emergency responder or ambulance, then give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask etc). Call a poison control center or doctor for treatment advice.

**Skin Contact:** Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

**Eye Contact:** Hold eyes open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eyes. Call a poison control center or doctor for treatment advice.

**Ingestion:** No emergency medical treatment necessary.

#### Most important symptoms and effects, both acute and delayed

Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), no additional symptoms and effects are anticipated.

#### Indication of immediate medical attention and special treatment needed

No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. Have the Safety Data Sheet, and if available, the product container or label with you when calling a poison control center or doctor, or going for treatment.

### 5. Fire Fighting Measures

#### Suitable extinguishing media

To extinguish combustible residues of this product use water fog, carbon dioxide, dry chemical or foam.

#### Special hazards arising from the substance or mixture

**Hazardous Combustion Products:** Under fire conditions some components of this product may decompose. The smoke may contain unidentified toxic and/or irritating compounds. Combustion products may include and are not limited to: Nitrogen oxides. Hydrogen chloride. Carbon monoxide. Carbon dioxide.

**Unusual Fire and Explosion Hazards:** This material will not burn until the water has evaporated. Residue can burn. If exposed to fire from another source and water is evaporated, exposure to high temperatures may cause toxic fumes.

**Advice for firefighters**

**Fire Fighting Procedures:** Keep people away. Isolate fire and deny unnecessary entry. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. To extinguish combustible residues of this product use water fog, carbon dioxide, dry chemical or foam. Contain fire water run-off if possible. Fire water run-off, if not contained, may cause environmental damage. Review the "Accidental Release Measures" and the "Ecological Information" sections of this (M)SDS.

**Special Protective Equipment for Firefighters:** Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

## 6. Accidental Release Measures

**Personal precautions, protective equipment and emergency procedures:** Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

**Environmental precautions:** Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

**Methods and materials for containment and cleaning up:** Contain spilled material if possible. Small spills: Absorb with materials such as: Clay. Dirt. Sand. Sweep up. Collect in suitable and properly labeled containers. Large spills: Contact Dow AgroSciences for clean-up assistance.

## 7. Handling and Storage

### Handling

**General Handling:** Keep out of reach of children. Do not swallow. Avoid breathing vapor or mist. Avoid contact with eyes, skin, and clothing. Use with adequate ventilation. Wash thoroughly after handling.

### Storage

Store in a dry place. Store in original container. Keep container tightly closed when not in use. Do not store near food, foodstuffs, drugs or potable water supplies.

## 8. Exposure Controls / Personal Protection

### Exposure Limits

Component	List	Type	Value
Propylene glycol	WEEL	TWA Aerosol.	10 mg/m3

RECOMMENDATIONS IN THIS SECTION ARE FOR MANUFACTURING, COMMERCIAL BLENDING AND PACKAGING WORKERS. APPLICATORS AND HANDLERS SHOULD SEE THE PRODUCT LABEL FOR PROPER PERSONAL PROTECTIVE EQUIPMENT AND CLOTHING.

### Personal Protection

**Eye/Face Protection:** Use safety glasses (with side shields).

**Skin Protection:** Wear clean, body-covering clothing.

**Hand protection:** Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur. Examples of preferred glove barrier materials

include: Chlorinated polyethylene. Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Viton. Examples of acceptable glove barrier materials include: Butyl rubber. Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyvinyl chloride ("PVC" or "vinyl"). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

**Respiratory Protection:** Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. In misty atmospheres, use an approved particulate respirator. The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.

**Ingestion:** Use good personal hygiene. Do not consume or store food in the work area. Wash hands before smoking or eating.

### Engineering Controls

**Ventilation:** Use local exhaust ventilation, or other engineering controls to maintain airborne levels below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, general ventilation should be sufficient for most operations. Local exhaust ventilation may be necessary for some operations.

## 9. Physical and Chemical Properties

### Appearance

#### Physical State

Liquid.

#### Color

White to off-white

#### Odor

Mild

#### Odor Threshold

No test data available

#### pH

6.76 (@ 1 %) *pH Electrode* 1% aqueous solution.

#### Melting Point

Not applicable

#### Freezing Point

No test data available

#### Boiling Point (760 mmHg)

No test data available.

#### Flash Point - Closed Cup

> 100 °C (> 212 °F) *Closed Cup*

#### Evaporation Rate (Butyl

No test data available

#### Acetate = 1)

#### Flammable Limits In Air

**Lower:** No test data available

**Upper:** No test data available

#### Vapor Pressure

Not applicable

#### Vapor Density (air = 1)

No test data available

#### Specific Gravity (H<sub>2</sub>O = 1)

1.059 *Digital Density Meter (Oscillating Coil)*

#### Solubility in water (by weight)

Not applicable

#### Partition coefficient, n-octanol/water (log Pow)

No data available for this product. See Section 12 for individual component data.

#### Autoignition Temperature

No test data available

#### Decomposition

No test data available

#### Temperature

#### Dynamic Viscosity

No test data available

#### Kinematic Viscosity

No test data available

#### Liquid Density

1.059 g/cm<sup>3</sup> @ 20 °C *Digital density meter*

## 10. Stability and Reactivity

### Reactivity

No dangerous reaction known under conditions of normal use.

### Chemical stability

Thermally stable at typical use temperatures.

**Possibility of hazardous reactions**

Polymerization will not occur.

**Conditions to Avoid:** Active ingredient decomposes at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems.

**Incompatible Materials:** Avoid contact with: Strong acids. Strong oxidizers.

**Hazardous decomposition products**

Decomposition products depend upon temperature, air supply and the presence of other materials.

Decomposition products can include and are not limited to: Hydrogen chloride. Nitrogen oxides.

## 11. Toxicological Information

**Acute Toxicity****Ingestion**

As product: LD50, Rat > 5,000 mg/kg

**Dermal**

As product: LD50, Rat > 5,000 mg/kg

**Inhalation**

As product: LC50, 4 h, Aerosol, Rat > 2.1 mg/l

No deaths occurred at this concentration.

**Eye damage/eye irritation**

Essentially nonirritating to eyes.

**Skin corrosion/irritation**

Brief contact is essentially nonirritating to skin.

**Sensitization****Skin**

Did not cause allergic skin reactions when tested in guinea pigs.

**Respiratory**

No relevant data found.

**Repeated Dose Toxicity**

For the active ingredient(s): In animals, effects have been reported on the following organs: Liver. Thyroid.

**Chronic Toxicity and Carcinogenicity**

For the active ingredient(s): Available data are inadequate to evaluate carcinogenicity.

**Developmental Toxicity**

For the active ingredient(s): Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Did not cause birth defects in laboratory animals.

**Reproductive Toxicity**

For the active ingredient(s): In animal studies, has been shown to interfere with reproduction in females.

**Genetic Toxicology**

For the active ingredient(s): In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

## 12. Ecological Information

**Toxicity****Data for Component: Fenbuconazole**

Material is highly toxic to aquatic organisms on an acute basis (LC50/EC50 between 0.1 and 1 mg/L in the most sensitive species tested). Material is slightly toxic to birds on a dietary basis (LC50 between 1001 and 5000 ppm). Material is practically non-toxic to birds on an acute basis (LD50 > 2000 mg/kg).

**Fish Acute & Prolonged Toxicity**

LC50, *Lepomis macrochirus* (Bluegill sunfish), flow-through test, 48 h: 0.68 mg/l

**Aquatic Invertebrate Acute Toxicity**

EC50, *Daphnia magna* (Water flea), static test, 48 h: 2.2 mg/l

LC50, *Americamysis bahia* (reported as *Mysidopsis bahia*), 96 h: 0.63 mg/l

**Aquatic Plant Toxicity**

EC50, *Pseudokirchneriella subcapitata* (green algae), static test, Growth inhibition (cell density reduction), 96 h: 0.66 mg/l

**Toxicity to Micro-organisms**

EC50, OECD 209 Test; activated sludge, 3 h: > 20 mg/l

**Toxicity to Above Ground Organisms**

oral LD50, *Colinus virginianus* (Bobwhite quail): > 2150 mg/kg bodyweight.

dietary LC50, *Colinus virginianus* (Bobwhite quail): 4050 mg/kg diet.

contact LD50, *Apis mellifera* (bees): > 292 ug/bee

**Toxicity to Soil Dwelling Organisms**

LC50, *Eisenia fetida* (earthworms), 14 d: > 98 mg/kg

EC50, *Eisenia fetida* (earthworms), 28 d: > 67 mg/kg

Data for Component: **Propylene glycol**

Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).

**Fish Acute & Prolonged Toxicity**

LC50, *Oncorhynchus mykiss* (rainbow trout), static test, 96 h: 40,613 mg/l

**Aquatic Invertebrate Acute Toxicity**

LC50, *Ceriodaphnia Dubia* (water flea), static test, 48 h: 18,340 mg/l

**Aquatic Plant Toxicity**

ErC50, *Pseudokirchneriella subcapitata* (green algae), Growth rate inhibition, 96 h: 19,000 mg/l

**Toxicity to Micro-organisms**

NOEC, no data available; *Pseudomonas putida*, 18 h: > 20,000 mg/l

**Aquatic Invertebrates Chronic Toxicity Value**

*Ceriodaphnia Dubia* (water flea), semi-static test, 7 d, reproduction, NOEC: 13020 mg/l

**Persistence and Degradability**

Data for Component: **Fenbuconazole**

Expected to degrade only slowly in the environment.

Data for Component: **Propylene glycol**

Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.

Biodegradation may occur under anaerobic conditions (in the absence of oxygen).

**OECD Biodegradation Tests:**

Biodegradation	Exposure Time	Method	10 Day Window
81 %	28 d	OECD 301F Test	pass
96 %	64 d	OECD 306 Test	Not applicable

**Indirect Photodegradation with OH Radicals**

Rate Constant	Atmospheric Half-life	Method
1.28E-11 cm <sup>3</sup> /s	10 h	Estimated.

**Biological oxygen demand (BOD):**

BOD 5	BOD 10	BOD 20	BOD 28
69.000 %	70.000 %	86.000 %	

**Chemical Oxygen Demand:** 1.53 mg/mg

**Theoretical Oxygen Demand:** 1.68 mg/mg

**Bioaccumulative potential**

Data for Component: **Fenbuconazole**

**Bioaccumulation:** Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).

**Partition coefficient, n-octanol/water (log Pow):** 3.23 Measured

Data for Component: **Propylene glycol**

**Bioaccumulation:** Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

**Partition coefficient, n-octanol/water (log Pow):** -1.07 Measured  
**Bioconcentration Factor (BCF):** 0.09; Estimated.

### Mobility in soil

Data for Component: **Fenbuconazole**

**Mobility in soil:** Expected to be relatively immobile in soil ( $K_{oc} > 5000$ )., Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process.

**Partition coefficient, soil organic carbon/water ( $K_{oc}$ ):**  $> 5,000$  Estimated.

**Henry's Law Constant (H):**  $8.31E-08 \text{ atm}\cdot\text{m}^3/\text{mole}$  Measured

Data for Component: **Propylene glycol**

**Mobility in soil:** Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process., Potential for mobility in soil is very high ( $K_{oc}$  between 0 and 50).

**Partition coefficient, soil organic carbon/water ( $K_{oc}$ ):**  $< 1$  Estimated.

**Henry's Law Constant (H):**  $1.2E-08 \text{ atm}\cdot\text{m}^3/\text{mole}$  Measured

## 13. Disposal Considerations

If wastes and/or containers cannot be disposed of according to the product label directions, disposal of this material must be in accordance with your local or area regulatory authorities. This information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. If the material as supplied becomes a waste, follow all applicable regional, national and local laws.

## 14. Transport Information

**DOT Non-Bulk**  
NOT REGULATED

**DOT Bulk**  
NOT REGULATED

### IMDG

**Proper Shipping Name:** ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S

**Technical Name:** FENBUCONAZOLE

**Hazard Class:** 9 **ID Number:** UN3082 **Packing Group:** PG III

**EMS Number:** f-a,s-f

**Marine pollutant.:** Yes

### ICAO/IATA

**Proper Shipping Name:** ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S

**Technical Name:** FENBUCONAZOLE

**Hazard Class:** 9 **ID Number:** UN3082 **Packing Group:** PG III

**Cargo Packing Instruction:** 964

**Passenger Packing Instruction:** 964

**Additional Information**

MARINE POLLUTANT  
FENBUCONAZOLE

*This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.*

## 15. Regulatory Information

### OSHA Hazard Communication Standard

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

### Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312

Immediate (Acute) Health Hazard	No
Delayed (Chronic) Health Hazard	Yes
Fire Hazard	No
Reactive Hazard	No
Sudden Release of Pressure Hazard	No

### Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

### Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Hazardous Substances List and/or Pennsylvania Environmental Hazardous Substance List:

The following product components are cited in the Pennsylvania Hazardous Substance List and/or the Pennsylvania Environmental Substance List, and are present at levels which require reporting.

Component	CAS #	Amount
Propylene glycol	57-55-6	4.5%

### Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Special Hazardous Substances List:

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

### Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) Section 103

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

### California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986)

This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

### Toxic Substances Control Act (TSCA)

All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.30

## 16. Other Information

### Hazard Rating System

NFPA	Health	Fire	Reactivity
	0	1	0

**Revision**

Identification Number: 68892 / 1016 / Issue Date 08/23/2011 / Version: 3.0

DAS Code: GF-1065

Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

**Legend**

N/A	Not available
W/W	Weight/Weight
OEL	Occupational Exposure Limit
STEL	Short Term Exposure Limit
TWA	Time Weighted Average
ACGIH	American Conference of Governmental Industrial Hygienists, Inc.
DOW IHG	Dow Industrial Hygiene Guideline
WEEL	Workplace Environmental Exposure Level
HAZ DES	Hazard Designation
Action Level	A value set by OSHA that is lower than the PEL which will trigger the need for activities such as exposure monitoring and medical surveillance if exceeded.

*Dow AgroSciences LLC urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.*