



Product Safety Assessment

ISOCLAST™ ACTIVE

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Names

- CAS No. 946578-00-3
- Isoclast™ active
- Isoclast
- Sulfoxaflor
- Sulfoxaflor 500WDG Insecticide
- Sulfoximine insecticides
- Cyanamide, N-[methyloxido[1-[6-(trifluoromethyl)-3-pyridinyl]ethyl]-λ⁴-sulfanylidene]
- TRANSFORM™ insecticides
- CLOSER™ insecticides
- EXPEDITION™ insecticides

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Product Overview

- Isoclast™ active¹ (sulfoxaflor) is the brand name for the active ingredient in a new chemical class of insecticides, sulfoximines. The technical-grade active is an off-white powder with a sharp odor containing more than 97.9% Isoclast. Products containing Isoclast are sold under the trade names such as TRANSFORM™ insecticides, CLOSER™ insecticides, and EXPEDITION™ insecticides.^{1,2,3} For further details, see the relevant [Product Label](#) and [Product Description](#).
- Isoclast is registered for use as an insecticide for all major crop groups against sap-feeding insect pests, including certain species of aphids, jassids, plant bugs, planthoppers, scales, stink bugs, and whiteflies.¹ For further details, see the relevant [Product Label](#) and [Product Uses](#).
- Exposure can occur either in facilities that manufacture or formulate Isoclast products or while applying products containing this material. Dow does not sell Isoclast for direct consumer use, but it may be used in insecticides available to consumers. For further details, see the relevant [Product Label](#) and [Exposure Potential](#).
- Contact may cause slight eye irritation. Brief skin contact may cause slight irritation with local redness. This material has low toxicity if swallowed. Repeated exposure has been shown to affect the liver in laboratory animals.^{2,3} For further details, see [Health Information](#) or the [Safety Data Sheet](#).
- If introduced into the environment, Isoclast will eventually bind to soil or sediment. Soil biodegradation with normal applications is less than one day. It will be removed by wastewater-treatment facilities as biosolids. The bioconcentration potential (tendency to accumulate in the food chain) of this product is moderate. This product is highly toxic to

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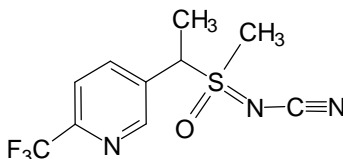
aquatic organisms on an acute basis (LC₅₀/EC₅₀ <0.1mg/L for the most sensitive species).^{1,3} For further details, see the relevant [Product Label](#) and [Environmental Information](#).

- Isoclast is stable under recommended storage and normal use conditions. Exposure to elevated temperatures may cause the material to decompose.² For further details, see the relevant [Product Label](#) and [Physical Hazard Information](#).

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Manufacture of Product

- **Capacity** – Dow AgroSciences LLC, a wholly owned subsidiary of The Dow Chemical Company, manufactures Isoclast.
- **Process** – Isoclast is produced using a complex and proprietary process involving a series of reaction and purification steps. The chemical structure of Isoclast is shown below:¹



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Product Description^{1,2,3}

Isoclast is the brand name for cyanamide, N-[methoxyimino-1-[6-(trifluoromethyl)-3-pyridinyl]ethyl]-λ⁴-sulfanylidene, the active ingredient in a new chemical class of insecticides, sulfoximines. It is currently marketed as a water-dispersible granular (WDG) and a suspension concentrate (SC), which are registered to Dow AgroSciences LLC, a wholly owned subsidiary of The Dow Chemical Company.

Technical-grade Isoclast is an off-white powder with a sharp odor containing more than 97.9% Isoclast. Insecticide products containing Isoclast are marketed under the trade names TRANSFORM™ insecticides, CLOSER™ insecticides, and EXPEDITION™ insecticides.

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Product Uses and Regulatory Information¹

Isoclast belongs to a novel chemical class called sulfoximines invented by Dow AgroSciences and offers extremely effective control of many important sap-feeding insect pests. It can be used in a large number of major crops, including cotton, soybean, cereals, rice, citrus, leafy and fruiting vegetables, potatoes, pome/stone fruit, nuts, grapes, apples, and strawberries. Isoclast controls sap-feeding insect pests, including certain species of aphids, jassids, plant bugs, planthoppers, scales, stink bugs, and whiteflies. Isoclast reacts with insect nicotinic acetylcholine receptors (nAChR) providing high efficacy at low use rates against insect species that often exhibit resistance to other insecticides. Registration has been approved in the United States as well as multiple other countries.

Regulations may exist that govern the manufacture, sale, transportation, use, and/or disposal of products containing Isoclast. These regulations may vary by city, state, country, or geographic region. Information may be found by consulting the relevant [Product Label](#), [Safety Data Sheet](#), or [Contact Us](#).

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Exposure Potential²

Isoclast is used in the formulation of insecticides. Based on the uses for this material, the public could be exposed through:

- **Workplace exposure** – Exposure can occur either in facilities that manufacture or formulate Isoclast products or during tank-mixing, application, and clean-up operations of products containing Isoclast. Those working with Isoclast in manufacturing or formulating operations could be exposed during maintenance, sampling, testing, or other procedures. Each manufacturing or formulating facility should have a thorough training program for employees and appropriate work processes, ventilation, and safety equipment in place to limit exposure. See [Health Information](#) or the [Product Label](#).
- **Consumer exposure to products containing Isoclast** – Dow does not sell Isoclast for direct consumer use, but it is used in the formulation of insecticides that may be used by consumers. Consumers could also be exposed to trace amounts of Isoclast through ingestion of residues in agricultural products or drinking water. To ensure pesticide safety with regard to human health, the United States Environmental Protection Agency (EPA) performs comprehensive risk-assessment calculations using conservative estimates of pesticide concentrations in drinking water, food, and nonfood sources. See [Health Information](#) or the [Product Label](#).
- **Environmental releases** – In the event of a spill, the focus is on containing the spill to prevent contamination of soil, surface water or groundwater. If introduced into the environment, Isoclast will eventually bind to soil or sediment. Biodegradation in soil under normal conditions is relatively fast. It can be removed by wastewater-treatment facilities as biosolids. The bioconcentration potential of this product is moderate. This product is highly toxic to aquatic organisms on an acute basis. Consult the relevant [Safety Data Sheet](#) or [Product Label](#) for more detailed information about protective equipment and procedures. See [Environmental](#), [Health](#), and [Physical Hazard Information](#).
- **In case of fire** – Isolate the fire. Deny any unnecessary entry into the area and consider the use of unmanned hose holders. Use water spray, carbon-dioxide extinguishers, or dry-chemical extinguishers to fight the fire. Combustion products may include sulfur oxides, nitrogen oxides, hydrogen fluoride, carbon monoxide, and carbon dioxide. Firefighters should wear positive-pressure, self-contained breathing apparatus (SCBA) and protective firefighting clothing. Keep fire water out of waterways and sewers to minimize the potential for environmental damage. Immediately withdraw all personnel from the area in case of rising sounds from venting safety device or discolorations of the container. Follow emergency procedures carefully. Consult the [Product Label](#) and [Safety Data Sheet](#) for specific firefighting measures. See [Environmental](#), [Health](#), and [Physical Hazard Information](#).
- **Emergency response information** – In the case of an emergency such as poisoning, product spillage, or fire associated with a Dow AgroSciences product please use the phone number listed on the Safety Data Sheet for the appropriate country. In some countries, the Emergency Response number is also provided on the label on the package.

For more information, see the relevant [Product Label](#) and [Safety Data Sheet](#).

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Health Information^{2,3}

Health information for Isoclast is summarized on the relevant [Safety Data Sheets](#). It is important to note that health risks associated with individual products may vary based on their formulation or intended use. The [Safety Data Sheet](#) is the preferred source for specific health information. These materials may also contain minor components or additives that may have additional health risks. An overview of health information for Isoclast technical appears below.

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Laboratory testing – Isoclast has been evaluated by comprehensive regulatory guidelines and registered and approved for sale and use in multiple countries. These guidelines require laboratory testing for potential short-term (acute) and long-term (chronic) health effects. These tests help scientists determine how chemicals might affect humans, domestic animals, or wildlife in cases of overexposure. Pesticide products used according to label directions are unlikely to cause toxic effects. The amount of pesticide that people and pets may be exposed to is low compared to those used in laboratory testing.

Health information for formulated Isoclast products is summarized on country-specific [Safety Data Sheets](#). These are a preferred source for specific health information as product formulations may contain components or additives with additional risks. For further details, also consult country-specific [Product Label](#).

Eye contact – Contact may cause slight eye irritation, but corneal injury is unlikely. Solid or dust from some formulations may cause irritation or corneal injury due to mechanical action (scratching the eye).

Skin contact – Brief contact may cause slight skin irritation with local redness. Prolonged skin contact is unlikely to result in absorption of harmful amounts.

Inhalation – No adverse effects are anticipated from a single exposure to dust.

Ingestion – This material has low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury.

Repeated exposure – This material has been shown to affect the liver in laboratory animals.

Other – This material has been shown to cause tumors in laboratory animals when exposed to concentrations that exceed relevant human dose levels; however, the effects are species-specific and not relevant to humans.

This material has been shown to interfere with reproduction and cause birth defects in rats when exposed to concentrations that exceed relevant human dose levels; excessive doses toxic to the parent animals caused decreased weight and survival of offspring. These effects are species-specific and not relevant to humans.

For more information, see the relevant [Product Label](#) and [Safety Data Sheet](#).

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Environmental Information^{3,4}

Based on the product chemistry, environmental data, and low application rates, when used appropriately, Isoclast formulations are expected to have minimal environmental impact and not expected to leach into groundwater. If introduced into the environment, Isoclast will eventually bind to soil or sediment. This material biodegrades in soil in less than one day in normal use conditions when applied per label rates. It would be removed by wastewater-treatment facilities as biosolids. The bioconcentration potential (tendency to accumulate in the food chain) of this product is moderate.

This product is highly toxic to aquatic organisms on an acute basis (LC₅₀/EC₅₀ <0.1mg/L for the most sensitive species).

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For more information, see the relevant [Product Label](#) and [Safety Data Sheet](#).

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Physical Hazard Information²

Isoclast is stable under recommended storage and normal use conditions. Exposure to elevated temperatures may cause the material to decompose. Toxic gases are released during decomposition including carbon monoxide, carbon dioxide, hydrogen fluoride, nitrogen oxides, and sulfur oxides.

There are no known incompatible materials.

For more information, see the relevant [Product Label](#) and [Safety Data Sheet](#).

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Additional Information

- Safety Data Sheets (<http://www.dowagro.com/products/>)
- Product Labels (<http://www.dowagro.com/products/>)
- Contact Us (<http://www.dowagro.com/company/contact/index.htm>)

For more business information about insecticide formulated with Isoclast, visit the [Dow AgroSciences](#) website at <http://www.dowagro.com/about/>.

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References

- ¹ *Sulfoxaflor Technical Bulletin*, Dow AgroSciences LLC, Form No. Y45-391-002BOD
- ² *Sulfoxaflor (Technical) Insecticide Material Safety Data Sheet*, Dow AgroSciences LLC
- ³ *Sulfoxaflor 500WDG Insecticide Material Safety Data Sheet*, Dow AgroSciences LLC
- ⁴ *Sulfoxaflor Technical Bulletin*, Dow AgroSciences LLC, Form No. Y45-391-002

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NOTICES:

As part of its 2015 Sustainability Goals, Dow has committed to make publicly available safety assessments for its products globally. This product safety assessment is intended to give general information about the chemical (or categories of chemicals) addressed. It is not intended to provide an in-depth discussion of health and safety information. Additional information is available through the relevant Safety Data Sheet, which should be consulted before use of the chemical. This product safety assessment does not replace required communication documents such as the Safety Data Sheet.

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