

ZIRAM

A powerful and versatile fungicide
manufactured and supplied by Eastman

- **Reliable and consistently effective**

Economical, broad-spectrum disease control that enables
excellent yields of high-quality produce

- **Resistance management tool**

Nonsystemic, multisite mode of action—ideal for tank
mix or alternation in fungicide spray programs

- **Nutrition and plant health**

Supports overall plant health by delivering
assimilable zinc as essential micronutrient

Growers continue to face potential loss of high-value crops due to a range of foliar diseases, as well as damage by deer and rodents. Ziram, a reliable and versatile fungicide, offers an economical solution to help combat these threats.

Ziram is a powerful fungicide that provides broad-spectrum disease control.* Nonphytotoxic, Ziram can be used on all crops and is typically used to support the healthy growth of perennial crops, stone fruits, and vegetables.

Ziram protects crops from damage in the field and prevents harvest deterioration in storage and during transport. Nonsystemic, Ziram acts on many sites of the biochemical process of harmful fungi, is effective against a variety of fungi, and is at low risk for resistance development.

Ziram's reliable and consistent performance makes it a valuable fungicide, enabling growers to reap an excellent yield of high-quality produce.

Eastman—driven to address the changing needs of the world and its growing population

Eastman is one of the world's largest producers of Ziram. We guarantee quality products for our customers and provide global support for regulatory dossiers. We are committed to ensuring Ziram is used to its fullest potential in the safest possible way.

Disease spectrum

Ziram controls a broad range of plant diseases caused by phytopathogenic fungi. It controls numerous ascomycetes (*Colletotrichum*, *Guignardia*, *Phomopsis*, *Alternaria*, *Pyricularia*, *Monilinia*, *Diaporthe*, *Septoria*, *Venturia*, *Taphrina*, *Stigmata*, *Stemphylium*), oomycetes (*Peronospora*, *Pseudoperonospora*, *Pythium* spp.), and basidiomycetes (*Rhizoctonia*, *Hemileia*).

Foliar application of Ziram protects fruits and leaves against summer diseases, leaf curl, shot hole, rot, scab, molds, downy mildews, and anthracnose.

- Ziram supports control of the bacteria *Xanthomonas* sp., which causes bacterial blight and bacterial leaf spot.
- Ziram is repellent to birds and game.

Nutrition and plant health

Zinc is an essential micronutrient for plant growth, chlorophyll synthesis, and stress tolerance. Zinc deficiency is one of the most widespread micronutrient deficiencies in crops and pastures worldwide and causes significant crop production quantity and quality loss. Containing 16.3% zinc, Ziram 76WG supports plant health by providing the plant with zinc in a form that can be absorbed through the leaves.

Resistance management

The multisite mode of action and broad-spectrum disease control make Ziram a good mixing partner with several single-site fungicides as part of resistance management strategies.

Ziram is nonsystemic and has a preventive mode of action. It inhibits spore germination and mycelium growth by interfering with a variety of enzymes involved in the respiration process, including cytochrome P450 and alcohol dehydrogenase.

Ziram is a FRAC Group M3 fungicide. When used according to the label, Ziram will not trigger resistance issues. Its use fits perfectly within resistance management programs.

Safety to honeybees and beneficial organisms

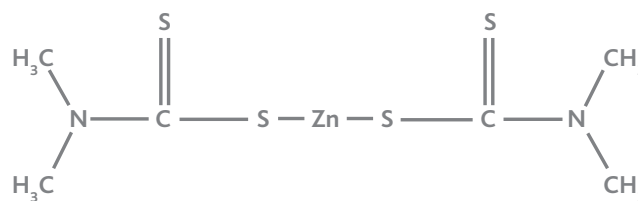
Ziram is safe to honeybees and other beneficial organisms such as mites, earthworms, and insects.

Bee safety with Ziram is demonstrated in multiple studies that evaluate the effects on bees or larvae individually as well as on colony health. Ziram does not impact the survival of adults or pupae, foraging activity, behavior, colony development and strength, or bee brood.

Ziram is therefore a suitable tool for controlling spring diseases during bloom stage.*

Chemistry and formulations

Ziram is a dimethyl-*bis*-dithiocarbamate that, unlike other dithiocarbamates, does not break down to ETU.



It is nonvolatile and has low water solubility that improves rainfast properties.

*When used according to the label. Label approval is given by local authorities after thorough evaluation of existing studies and according to national requirements.



Main registered foliar uses of Ziram formulations supported by Eastman

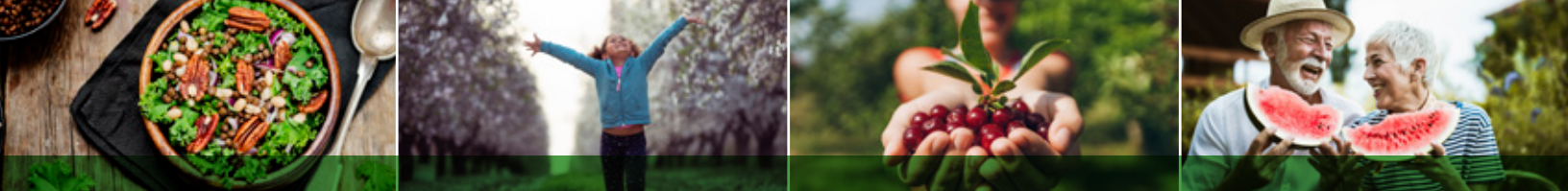


| | Argentina | Australia | Chile | Colombia | Costa Rica | Croatia | Cyprus | Ecuador | El Salvador | France | Greece | Guatemala | Honduras | Indonesia | Italy | Macedonia | Malaysia | Mexico | Morocco | New Zealand | Portugal | Serbia | Thailand | Tunisia | Uruguay | U.S.A. | Vietnam |
|--|-----------|-----------|-------|----------|------------|---------|--------|---------|-------------|--------|--------|-----------|----------|-----------|-------|-----------|----------|--------|---------|-------------|----------|--------|----------|---------|---------|--------|---------|
| Tropical fruits | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Banana and plantains | | | | ● | | | | | | | | | | | | | | | | | | | | | | | |
| Mango | | | | | | | | | | | | | | ● | | | | | | | | | ● | | | | |
| Papaya | | | | | | | | | | | | | | | | | | ● | | | | | | | | | |
| Stone fruit | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Peach | ● | ● | ● | | | ● | ● | | ● | ● | ● | ● | | | | ● | ● | | | ● | ● | ● | ● | | | ● | ● |
| Apricot | | | | | | | | | | ● | ● | | | | | | | | | | ● | | | | | | ● |
| Nectarine | | ● | ● | | | | | | | | | | | | | | | | ● | ● | | | | | | | ● |
| Cherry | | ● | | | | | | | | | | | | | | ● | ● | | | | ● | | | | | | ● |
| Plum | ● | | | | | | | | | | | | | | | ● | ● | | | | | | | | | | |
| Pome fruit | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Apple | ● | ● | | | | ● | ● | | | ● | ● | ● | | ● | ● | ● | | ● | | ● | | ● | | | | | ● |
| Pear | ● | ● | | | | ● | ● | | | ● | ● | | | | | ● | ● | | | | ● | | | ● | | | ● |
| Soft berries and grapes | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Strawberry | | | | | ● | | | | | | | | | | | | | | | | | | | | | | |
| Berry fruit | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| Grape | ● | ● | | | | | | | | | | | | | | | | ● | | | | | | | | ● | ● |
| Other fruits | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Citrus fruit | ● | | | | | | | | | | | | | ● | | | | | | | | | ● | | ● | | |
| Nuts and olives | | | | | | ● | | | | ● | | | | | | ● | ● | | | | | | | | | | ● |
| Vegetables | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fruiting vegetables (e.g., tomato, cucumber, watermelon) | ● | | | ● | ● | | | ● | ● | | | ● | ● | | | | ● | ● | | | | | ● | | ● | ● | |
| Legumes (e.g., bean, pea) | ● | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | ● | | | | |
| Leafy vegetables (e.g., celery, lettuce, cabbage) | ● | ● | | | | | | | | | | ● | | | | | ● | | | | | | ● | | | | |
| Tubers and bulbs (e.g., potato, onion, carrot) | ● | | | ● | ● | | | ● | ● | | ● | ● | ● | ● | | | | ● | | | ● | | ● | | ● | | |
| Other crops | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ornamentals and turf | ● | ● | | ● | | | | | | | | | | | | | | ● | | | | | ● | | | | ● |
| Rice, coffee, tobacco | | | | ● | | | | | | | | ● | | | | | | ● | | | | | | | | | ● |

This overview is subject to change depending on the evaluation and registration of individual countries.

Not all uses and/or products are registered in all countries/regions. For the most recent status, contact your local customer service representative for availability in your region.





Foliar

For foliar uses, Ziram is formulated as high-quality water-dispersible granules (WG). This facilitates handling and makes the product suitable for high-performance spraying machines.

Eastman's WG formulation is virtually dust-free and disperses quickly in the spray tank. The spherical granules combine outstanding wettability and suspension characteristics with ease of storage and insensitivity to temperature variations.

Supply and logistics

As one of the world's largest producers of methylamines and derivatives, Eastman offers a secure supply of its key raw materials for manufacturing dithiocarbamates. The central location of our manufacturing site in Belgium, near the Port of Antwerp—Europe's second largest port—makes Eastman an agile global supplier of Ziram.

Packaging

| Formulation | Packaging | Pack weight | Pallets |
|---------------------------|-----------|----------------|------------|
| Water-dispersible granule | Big bag | 500 kg | 500-kg CP1 |
| | Paper bag | 10 kg or 20 kg | 500-kg CP1 |

Stewardship commitment

Eastman is committed to stewardship and has a dedicated crop protection stewardship team that provides information and documentation on the correct and safe application of our products. Our training activities teach farmers how to use our crop protection products effectively and safely, which helps increase the yield and quality of their harvested goods. Farmers worldwide have received safety training from Eastman.

Most of our training takes place as part of customer events and meetings, because safety training is an integral part of the way our business operates. Additional courses are conducted in cooperation with partners such as local, regional, and international associations.

In countries with no statutory requirements for certification, Eastman focuses on training end users on the safe handling of our products. With our regional organizations and local distributors, we establish action plans for the prioritized countries that are then implemented locally. On-site safety checks and safe application training are also available on request.

EASTMAN

The results of insight™

Eastman Corporate Headquarters
P.O. Box 431
Kingsport, TN 37662-5280 U.S.A.

U.S.A. and Canada, 800-EASTMAN (800-327-8626)
Other Locations, +(1) 423-229-2000

www.eastman.com/locations

Although the information and recommendations set forth herein are presented in good faith, Eastman Chemical Company ("Eastman") and its subsidiaries make no representations or warranties as to the completeness or accuracy thereof. You must make your own determination of its suitability and completeness for your own use, for the protection of the environment, and for the health and safety of your employees and purchasers of your products. Nothing contained herein is to be construed as a recommendation to use any product, process, equipment, or formulation in conflict with any patent, and we make no representations or warranties, express or implied, that the use thereof will not infringe any patent. 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 NOTHING HEREIN WAIVES ANY OF THE SELLER'S CONDITIONS OF SALE.

Safety Data Sheets providing safety precautions that should be observed when handling and storing our products are available online or by request. You should obtain and review available material safety information before handling our products. If any materials mentioned are not our products, appropriate industrial hygiene and other safety precautions recommended by their manufacturers should be observed.

© 2020 Eastman. Eastman brands referenced herein are trademarks of Eastman or one of its subsidiaries or are being used under license. The ® symbol denotes registered trademark status in the U.S.; marks may also be registered internationally. Non-Eastman brands referenced herein are trademarks of their respective owners.