

# Antimony Trioxide

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Antimony trioxide is a naturally occurring mineral found in the earth's crust. Antimony trioxide is often used in plastic formulations in conjunction with a halogen-based chemical to reduce a product's flammability. Antimony trioxide has the unique ability to make halogen-based plastic additives more effective in reducing the flammability of the finished plastics. Antimony trioxide, commonly referred to as ATO, is typically a white, solid powder that can form dust in air. ATO is only used as an industrial product in manufacturing locations designed for the handling of plastics and chemicals. Since the products made from ATO that are covered by this product safety assessment are industrial chemicals, the public is unlikely to come into contact with these products.

## Identification

There are a number names that are used to identify antimony trioxide including:

- Antimony trioxide
- ATO
- Antimony oxide
- Diantimony trioxide
- CAS Number 1309-64-4

Products sold by LANXESS Solutions US Inc. that contain antimony trioxide include

- TMS<sup>®</sup>
- Timonox<sup>®</sup> Red Star, Timonox Blue Star Polymer Grade
- Fireshield<sup>®</sup> H, Fireshield L, Fireshield H-HPM, Fireshield HB
- Thermoguard<sup>®</sup> S, Thermoguard HPM, Thermoguard L
- Timonox<sup>®</sup> White Star
- TMS-HP<sup>®</sup>
- Trutint<sup>®</sup> 50
- Microfine<sup>®</sup> A05, Microfine A03
- Ultrafine<sup>®</sup> II

**NOTE:** While these products may or may not be used in conjunction with halogen-based chemicals by our customers, the above products do not themselves contain any halogens.

### Description

#### Production:

Antimony trioxide products are produced in manufacturing units designed for the production of chemicals. Antimony trioxide is made by roasting antimony metal in a furnace with oxygen present. The antimony vapors react with the oxygen and form a fine, white dust that is collected in a special filtration system and ultimately packaged for use by our customers. Antimony trioxide products are packaged into 25 kg bags stacked on pallets or bulk bags for distribution to the industrial sites where they will be used by other companies.

#### Uses:

Antimony trioxide is predominantly used in plastics where resistance to ignition and flammability are required. Antimony trioxide functions as a synergist, reducing the amount of halogen-based product required to achieve desired levels of flammability resistance performance. ATO has also been found to be useful as a catalyst for PET manufacture, as a frictional additive in automotive brake linings, as a clarifier for glass, as an opacifier for enamels, as a coating for titanium dioxide applications, and as a stabilizer for certain pigments.

<b>Properties:</b>	Appearance:	fine white powder
	Melting Point:	656 °C
	Solubility in Water:	0.25% Max

### Potential Human Health Effects

#### Health Effects:

Antimony trioxide is safe to use in industrial settings that utilize proper handling protocols and when recommended exposure guidelines are followed.

Because antimony trioxide is a fine powder, the most likely exposure scenario is due to dust that could form when the bags are being discharged in an industrial setting. If poor ventilation is employed or appropriate personal protective equipment is not worn, dust that is formed during handling could be inhaled and effect the respiratory system.

Risk assessments conducted by Environment Canada (EC) and the European Chemical Agency (ECHA), and the United States Environmental Protection Agency (EPA) have concluded that ATO is acceptable for use in its intended applications due to the low likelihood of exposure among the general population and in the environment.

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Some health and safety authorities have indicated that antimony trioxide is carcinogenic in animals and may be a cancer risk to humans when inhaled, while other agencies have not. The industry and others are engaged in ongoing study of this question.

Some products that are composed predominantly of antimony trioxide can contain trace levels of lead and arsenic which will contribute to that product's hazard profile, primarily for workers who handle the product during manufacturing. The Safety Data Sheet should be consulted to assess the specific hazards associated with the antimony trioxide product of interest.

Antimony trioxide dust that comes into contact with skin that is hot and damp can lead to skin irritation as a result of individual particles of the material becoming trapped in skin pores. This phenomenon can lead to an acne-like condition on exposed areas of skin. It is generally associated with the forearms of individuals that empty the bags of antimony trioxide in an industrial setting. The skin irritation can readily be prevented by proper use of personal protective equipment.

### **Industrial Use:**

ATO is used in a wide variety of polymer-based products. It is used in well-controlled manufacturing facilities by people trained in the handling of polymer additives. ATO used in a manufacturing setting is processed using best practice techniques developed to minimize any potential risk of exposure. Typically, sites utilize engineered systems to minimize the potential for exposure to all chemicals used in the process. An unplanned release of ATO is not expected to represent a life-threatening situation due to its chemical characteristics. In any spill or release incident, all non-essential personnel are immediately evacuated upwind of the spilled material. All personnel involved with cleaning a spill are trained and properly equipped with the required personal protective equipment.

### **Consumer Use:**

It is very unlikely that consumers would be exposed to ATO in its concentrated form because it is only sold for industrial use to make polymers and other products and is not sold directly to consumers. There is no known data indicating that ATO can readily leach out of the products where it is used in a manner that represents significant risk for consumers.

### **Environmental Release:**

When used in an industrial setting, ATO is typically handled using engineered systems designed to control releases from the facility.

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ATO that is released will collect on hard surfaces and could potentially mix with soil or other porous surfaces. Contained releases of ATO should be collected and disposed of per established protocols. Soils contaminated by spills should be remediated and disposed of in an appropriate manner.

### Physical Hazards

Antimony trioxide is an odorless, white powder. The powder is made up of fine to very fine particles. Antimony trioxide will not melt or vaporize during normal handling and use and consequently will not form vapors unless heated to extremely high temperatures. Antimony trioxide is considered to be very slightly soluble in water. Though not readily flammable, in a fire situation it can contribute to the formation of noxious vapors in the air.

### Potential Environmental Impact

#### Environmental Fate Information:

Given its negligible vapor pressure and limited water solubility, antimony trioxide that is released into the environment will tend to remain in soil rather than migrate into other environmental media, such as air or water. However, because antimony trioxide has some solubility in water, it will eventually come into contact with moisture and dissolve in water to generate antimony ions. Antimony, being a natural element, cannot by definition be degraded. However, it can react with other materials in the soil and water to form other compounds.

Antimony trioxide that enters the soil will likely react with any iron, aluminum and manganese compounds that might be present in the soil to form other antimony compounds.

Antimony from industrial sources that is unintentionally discharged into the environment can easily make its way into streams and waterways where it is likely to be carried to and settle in areas of active sedimentation, such as where a river empties into a lake or a bay.

#### Aquatic and/or Terrestrial Toxicity:

The European Union risk assessment indicated that measured and/or worst-case modeled antimony release data/estimates show that none of the identified uses of ATO pose a risk to the environment on a continental, regional or local scale.

As a result of EPA's risk assessment conducted for antimony trioxide, EPA concluded that there are no ecological concerns associated with the use of ATO in halogenated flame retardants.

### **Product Stewardship:**

#### **Manufacturing locations:**

Facility management procedures, Safety Data Sheets, technical guidance documents, and training are used to communicate safe handling, risk mitigation measures and emergency response requirements to employees at processing locations. Personal protective equipment should be used to prevent contact with ATO solids or dust. Protective clothing, respiratory protection, gloves and eye protection are commonly worn when handling ATO in an industrial setting. LANXESS Solutions US Inc. supplies ATO to companies that have a long history and/or experience in using similar products in their applications.

#### **Environment:**

Managing emissions during manufacture and processing of polymer additives is the focus of the Voluntary Emissions Control Action Program (VECAP), a product stewardship initiative introduced and managed by major manufacturers of treatments to reduce the flammability of plastic products. VECAP is used by our industry to partner with the supply chain to understand, control and reduce releases into the environment through application of best practices.

LANXESS Solutions US Inc. further recommends that solid waste and packaging waste be either incinerated with an adequate gas cleaning system or sent to a controlled landfill.

#### **Consumers:**

Consumers are not likely to be exposed to ATO distributed by LANXESS Solutions US Inc., because it is not sold directly to consumers nor do we endorse sales to consumer markets.

LANXESS Solutions US Inc. conducts an ongoing analysis of its products to evaluate potential risk areas throughout the product's life cycle. Chemical risks are identified at the very early stage of new products. They are evaluated by stage-gated reviews using environmental, health, and safety (EHS) criteria. The analysis of existing products will evaluate raw materials, manufacturing, transportation, customer end-use and disposal. Additionally, before changes in existing product formulations are made, a detailed evaluation is made of the proposed change. A critical component of all of these processes is the Safety Data Sheet, which lists detailed product hazard information.

Potential product risks are identified and managed using internal and external controls. In the context of a continually improving risk-reduction program, periodic reviews of the current controls are conducted in order to identify opportunities for improvements or enhancements. This includes adaptation of existing procedures to changes in regulations (e.g., covering workplace and transportation).

### Conclusion

ATO is chemical with a unique and highly specialized ability to improve the safety of plastics and other organic materials by reducing flammability in a manner that maintains end-product performance characteristics. It is a chemical that has been highly scrutinized by a number of regulatory bodies globally and found to be safe when used in its intended applications. Though there are potential hazards associated with ATO, it is only handled by highly trained people in manufacturing environments utilizing specialty equipment, safety controls, and personal protective equipment.

### Contact Information

LANXESS Solutions US Inc.

[www.LANXESS.com](http://www.LANXESS.com)

### Notices

#### Use and Application Information

The manner in which you use and the purpose to which you put and utilize our products, technical assistance and information (whether verbal, written or by way of production evaluations), including any suggested formulations and recommendations are beyond our control. Therefore, it is imperative that you test our products, technical assistance and information to determine to your own satisfaction whether they are suitable for your intended uses and applications. This application-specific analysis must at least include testing to determine suitability from a technical as well as health, safety, and environmental standpoint. Such testing has not necessarily been done by us. Unless we otherwise agree in writing, all products are sold strictly pursuant to the terms of our standard conditions of sale. All information and technical assistance is given without warranty or guarantee and is subject to change without notice. It is expressly understood and agreed that you assume and hereby expressly release us from all liability, in tort, contract or otherwise, incurred in connection with the use of our products, technical assistance, and information. Any statement or recommendation not contained herein is unauthorized and shall not bind us. Nothing herein shall be construed as a recommendation to use any product in conflict with patents covering any material or its use. No license is implied or in fact granted under the claims of any patent.