

# Safety Data Sheet

## Silver Powder

Created: Nov. 09. 2010

Revised: Nov. 01. 2016

### 1. Chemical Articles and Company Information

Name of Chemical Article:	Silver (powder)
Company Name:	Toyo Chemical Industrial Co., Ltd.
Address:	2-26-13 Naka-Izumi, Komae-City, Tokyo
Tel.:	+81-3-3489-5152
Fax:	+81-3-3-3488-1706
Emergency Contact:	As above
Recommended Applications and Use Restrictions:	Electronic parts materials, For testing and research, For industrial

### 2. Summary of Hazards

GHS Classification		
Damage to health	Critical injury to eyes and eye irritant	Class 2B
	Skin sensitization	Class 1
	Specific target organ and systemic toxicity (single exposure)	Class 1 (respiratory system)
	Specific target organ and systemic toxicity (repeated exposure)	Class 1 (eyes, respiratory organs: inhalation)

GHS Label Elements

Picture descriptions:



Cautionary terms:

Danger

Hazard information:

Eye irritant  
 Risk of allergic skin reaction  
 Damage to respiratory system  
 Damage to eyes and respiratory organs (inhalation) due to long-term or repeated exposure.

Cautions

Safety Measures:

When using the product, do not eat, drink, or smoke.  
 Do not remove contaminated clothing from the worksite.  
 Do not inhale dust or fumes.  
 Wash hands thoroughly after handling.  
 Wear protective gloves, goggles, and face mask.

Emergency Measures:

If the substance contacts the eye, irrigate thoroughly for at least 15 minutes.  
 If contact lenses can be removed easily, remove and wash them.  
 If the substance adheres to the skin, wash using copious amounts of soap and water.  
 If reusing soiled protective clothing, wash thoroughly before reuse.  
 If exposed or fear exposure, consult a physician to receive diagnosis and treatment.  
 If eye irritation persists, consult a physician and receive treatment.  
 If you feel unwell, consult a physician to receive diagnosis and treatment.  
 If skin irritation occurs, consult a physician to receive diagnosis and treatment.

Storage:

Lock the storage location.

Disposal: When discarding, entrust disposal of containers and contents to a specialized waste disposal company who is authorized by the prefectural governor.

Other hazards: Not available

### 3. Composition and Component Information

Single Substance or Mixture: Single Substance

Chemical name or general name: Silver

Another name: Argentum

Concentration or concentration range: 99.9 % min.

Molecular formula (molecular weight): Ag (107.87)

Chemical characteristics (rational or structural formula): **Ag**

CAS No.: 7440-22-4

Reference numbers in gazetted list in japan (CSCL and ISHL): Outside scope (outside applications because substance is an element)

Impurities and stabilization additives that contribute to the classification: No information

### 4. Emergency Measures

If inhaled: Immediately relocate the injured to a site with fresh air, and have them rest in an easy-to-breath position.  
If you feel unwell, consult a physician and receive treatment.

Adhesion to skin: Promptly wash skin using copious amounts of water and soap.  
Consult a physician for treatment.  
If the skin is irritated, or if you feel unwell, consult a physician for treatment.

Contact with eyes: Promptly wash deeply under flowing water for at least 15 minutes.  
If contact lenses are worn and can be removed easily, remove and wash them.  
If eye irritation persists, consult a physician and receive treatment.

If ingested: Promptly rise out the mouth and gargle.  
If you feel unwell, consult a physician and receive treatment.

The most important sign of an acute symptom and the tardive symptom and symptom: Effects of long-term or repeated exposure: May cause discoloration of the eyes, nose, throat, or skin (silver deposition; silver poisoning).

Protection of people implementing emergency measures: No information

Special precautions for physicians: No information

### 5. Measures during Fires

Extinguishing agents: This product in itself does not burn.  
Use the appropriate extinguishant depending on neighboring fires.

Extinguishing agents that must not be used: No information

Characteristic dangers: Irritants or harmful gas (or fumes) may be emitted during fires.

Characteristic extinguishing methods: Promptly move containers in the vicinity of the fire to a safe location. If moving is not possible, scatter water on the containers and their surroundings to cool.

Protection of firefighters: Fight fire from upwind.  
Wear respiratory protectors depending on the circumstances.

### 6. Measures during Leaks

Physical precautions, protective equipment, and measures during emergencies: The worker wears a tool for appropriate protection (in item of "8. Exposure Avoidance and Protection Measures" reference) and avoids clothes, contact and inhalation to skin.  
Cordon off the periphery of the dispersal area to prohibit the entrance of personnel.

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Environmental precautions:	Make sure there is no discharge of the product or unprocessed thick effluent into rivers, sewer systems, or soil, etc.
Methods and materials for contamination and methods and materials for cleaning up:	Stop the leak if there is no danger.
Collection and neutralization:	Sweep together any leaks to prevent dust inhalation, and collect in an empty sealable container.
Preventing secondary accidents:	Residue on the floor risks slipping, so process assiduously.

## 7. Handling and Storage Precautions

Handling	
Technical measures:	Install local exhausters, and eye and hand washing facilities, in the handling locations. Ideally, handle in locations with local exhausters and overall ventilators. Wear protective gloves, goggles, and face mask.
Precautions for safe handling:	Do not touch, inhale, or drink. Do not remove contaminated clothing from the worksite. Do not inhale dust or fumes. Wash hands thoroughly after handling. Use only outdoors or in a well-ventilated area.
Contact evasion:	In item of "10. Stability and Reactivity" reference.
Storage	
Safe storage conditions:	Lock the storage location. Technical measures: Install the necessary lighting, illuminations, and ventilation.
Container and packing materials:	There are not packing, the regulation of the container. The container uses the sealing up-type thing which is not damaged.

## 8. Exposure Avoidance and Protection Measures

Control concentration:	No information
Tolerable concentration:	
Japan Society for Occupational Health (2015)	0.01 mg/m <sup>3</sup>
ACGIH (2014)	TLV-TWA 0.1 mg/m <sup>3</sup>
Equipment Measures:	Install local ventilators, eye washing facilities, safety showers, and hand washing facilities, in the handling locations. When dust, Hume occur by a high heat process, install a ventilating device to keep an air pollutant management density or less.
Protective Equipment	
Respirator:	When ventilation is insufficient, wear respiratory protection equipment (dustproof masks).
Hand protective equipment:	Wear protective gloves. (Rubber gloves, etc.)
Eye protective equipment:	Wear protective goggles (regular glasses, regular glasses with lateral plates, or goggles)
Skin and body protective equipment:	Wear protective face equipment, long-sleeved work clothing, and protective shoes, etc. (Protective clothing, protective boots, etc.)

## 9. Physical and Chemical Properties

Physical properties	
Shape:	Powder
Color:	White or grey
Odor:	Odorless
Odor threshold value:	No information
pH:	No information
Melting point and coagulation point:	962°C (melting point)
Boiling point, initial boiling point, and boiling range:	2,212°C (boiling point)
Ignition Point:	No information
Vaporization speed (butyl acetate = 1):	No information

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Burnability (solids and gas):	No information
Explosion range:	No information
Vapor pressure:	No information
Vapor density (vapor = 1):	No information
Specific gravity (density):	10.5
Solubility:	Insoluble (Water)
n-Octanol/water partition coefficient:	No information
Spontaneous ignition temperature:	No information
Dissolution temperature:	No information
Viscosity:	No information

### 10. Stability and Reactivity

Reactivity:	No information
Stability:	Stable under normal handling conditions.
Possibility of harmful reactions:	Discolors black when exposed to ozone, hydrogen sulfide, and sulfur. Cannot make contact with strong acids or strong bases. Forms shock-sensitive compounds with acetylene. Fine silver fragments and concentrated hydrogen peroxide solutions may explode (i.e., break down violently and emit oxygen gas). Further, when dry, contact with ammonia may create explosive compounds. Reacts easily with dilute nitric acid and concentrated sulfuric acid. There is a danger of fire.
Conditions to be avoided:	No information
Incompatible substances:	Strong acids, strong bases, concentrated hydrogen peroxide solutions, ammonia (when dry), dilute nitric acid, concentrated sulfuric acid
Hazardous degradation products:	No information

### 11. Harmfulness Information

Acute toxicity	
Oral:	Oral: Rat LD50 > 5,000 mg/kg (HSDB (2003))
Pass; skin:	Percutaneous: Rat LD50 > 2,000 mg/kg (HSDB (2003))
Inhalation:Gas	The definition of GHS is a solid.
Inhalation:Steam	The definition of GHS is a solid.
Inhalation:Dust,Mist	No data available
Skin corrosiveness and irritation:	Testing on rabbits describes "Slightly Irritating (IUCLID (2000))."
Critical injury to eyes and eye irritant:	Classified 2B based on the descriptions of mild irritation and repetition over 48 hours in rabbit testing (IUCLID (2000)).Eye irritation (class 2B)
Respiratory organ sensitivity:	No data available
Skin sensitivity:	Classified 1 based on exposure to dust causing allergic contact dermatitis (ACGIH (7th, 2001)), and allergic reactions due to contact with personal accessories containing silver (PATTY (5th, 2001)). Risk of allergic dermal reaction (class 1)
Germ-cell mutagenicity:	No data available
Carcinogenicity:	No information from classification and evaluation organizations such as IARC, etc. In tests where rats were injected intramuscularly with the powder, no carcinogenicity was identified (PATTY (5th, 2001)), and nor was any carcinogenicity shown in humans (PATTY (5th, 2001)) (HSDB (2003)).
Reproductive toxicity:	No data available
Specific target organs and systemic toxicity (single exposure):	4-hour exposure to heated metallic silver vapor caused lung damage concomitant with pulmonary edema (ACGIH (7th, 2001)). Occupational exposure to dust causes airway irritation (ATSDR ToxFAQs (1997)). Respiratory system failure (class 1)

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Specific target organs and systemic toxicity (repeated exposures):

Occupational exposure to dust causes silver poisoning (argyria) through pigment depositions on skin or mucous membranes (ACGIH (7th, 2001)) (PATTY (5th, 2001)), but classified 1 (eye) as the manifestation of functional impairment was described as a reduction in nighttime vision (ATSDR ToxFAQs (1997)).  
Classified 1 (respiratory organs: inhalation) as there are descriptions of bronchitis from deposition to the lungs due to long-term inhalation of the dust (PATTY (5th, 2001)) (HSDB(2003)). Damage to eyes and respiratory organs (inhalation) due to long-term or repeated exposure (class 1)

Inhalable respiratory organ harmfulness: No data available

12. Environmental Impact Information

Ecotoxicity

Aquatic environmental harm (acute hazard):

No data available

Aquatic environmental harm (long-term hazard):

No data available

Hazard to the ozone layer :

The materials concerned are not listed by an affiliated book of Montreal Protocol.

13. Disposal Precautions:

Residual waste:

Discard according to the related laws and regulations, and local government standards. Submit an industrial waste control documentation (manifest) and entrust waste processing to an industrial waste disposal company authorized by the prefectural governor, etc. If outsourcing waste disposal, thoroughly notify the disposal companies of the dangers and harmfulness before outsourcing. Avoid discharging waste solutions and effluent containing the product directly into rivers, etc., and discarding as is in a landfill.

Dirty containers and packaging:

Suitably process containers according to the related laws and regulations, and local government standards. When disposing of empty containers, make sure to discard the contents completely.

Reference: Recycling Law

As silver is a precious metal, entrust its recovery to a professional, and then reuse.

Dirty containers and packaging: Either clean and recycle the containers, or dispose of them suitably according to the relevant laws and regulations, and local government standards.

14. Shipping Precautions

International Regulations

UN No: -

Proper Shipping Name: -

Class: -

Sub Risk: -

Packing Group: -

Marine Pollutant: -

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: -

Japanese Regulations

Land Regulation Information -

Maritime Regulation Information -

Aviation Regulation Information -

Special safety measures During transport, avoid direct sunlight, and load so that the containers are not damaged, corroded, or leaking, and secure the load to prevent toppling. Do not place on hazardous materials or easily flammable materials. Do not load alongside hazardous materials.

## 15. Applicable Laws

※This is the laws and regulations of Japan. Please follow the laws and regulations of the country

Industrial Safety and Health Law:	Hazardous material No. 137, requiring notification and display of its name, etc., as per Article 57.2 of the Law (Article 18.2 of the Ordinance)
PRTR Law:	Class 1 designated chemical substance (attached table 1-82)

## 16. Other Information

Bibliography:	GHS classification results database: NITE website GHS model SDS information: JISHA website Reagent guidebook (Revised 2003) Collection of Poisonous Materials Standard Notifications Dictionary of Chemistry (1987 30th printing: Kyoritsu Shuppan) 16112 Chemical Products (2012 The Chemical Daily)
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### \*Caution:

Hazard and harmfulness evaluations were created using the data and information available at the current time, but is not necessarily thorough, so handle with care.

Further, the data and evaluations described herein are not in any way guaranteed. The descriptions refer to normal handling, so for special handling, first implement safety measures conforming to the new application and methods of use.

This SDS is translated into English.(Original version is Japanese)