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Ver.13

## Safety Data Sheet

### Product No. (Common name : Silver Powder)

#### 1. Product and company information

Product Name :	DFA01N (Common name : Silver Powder)
Company Name :	Toyo Chemical Industrial Co., Ltd.
Address :	2-26-13 Naka-Izumi, Komae-City, Tokyo
Tel :	+81-3-3489-5152
Fax :	+81-3-3488-1706
Emergency Contact :	As above
Recommended use of the product and restrictions on use :	Electronic parts materials, For testing and research, For industrial

#### 2. Hazard identification

GHS classification of the substance

Health hazards :	Serious eye damage/irritation	Category 2B
	Skin sensitization	Category 1
	Specific target organ toxicity, single exposure	Category 1 (respiratory system)
	Specific target organ toxicity, repeated exposure	Category 1 (eyes, respiratory organs: inhalation)

GHS Label elements

Pictograms :



Signal word :

Danger

Hazard statements :

H317 : May cause an allergic skin reaction  
 H320 : Causes eye irritation  
 H370 : Causes damage to organs  
 H372 : Causes damage to organs through prolonged or repeated exposure

Precautionary statement

Safety measures :

P260 : Do not breathe dust.  
 P264 : Wash hand thoroughly after handling.  
 P270 : Do not eat, drink or smoke when using this product.  
 P272 : Contaminated work clothing should not be allowed out of the workplace.  
 P280 : Wear protective gloves/protective clothing/eye protection/face protection.  
 P314 : Get medical advice/attention if you feel unwell.  
 P302 + P352 : If on skin: wash with plenty of water.  
 P305 + P351 + P338 : If in eyes: Rinse cautiously with water for several minutes.  
     Remove contact lenses if present and easy to do - continue rinsing.  
 P308 + P311 : If exposed or concerned: Call a doctor  
 P337 + P313 : If eye irritation persists: Get medical advice/attention.  
 P333 + P313 : If skin irritation or rash occurs: Get medical advice/attention.  
 P362 + P364 : Take off contaminated clothing and wash it before reuse.

Emergency measures :

P405 : Store locked up.  
 P501 : Dispose of contents/container entrust to a specialized waste disposal company.  
 Other hazards: Not available

### 3. Composition/information on ingredients

Substance or Mixture :		Substance			
Chemical name	Molecular formula (molecular weight)	CAS No.	Reference numbers in gazetted list in Japan (CSCL)	Reference numbers in gazetted list in Japan (ISHL)	Concentration or concentration range
Silver (powder)	Ag (107.868)	7440-22-4	Not applicable	Not applicable	By Product No.
Additives	Not disclosed	Not disclosed	Not applicable	Not applicable	Not disclosed

### 4. First-aid measures

Inhalation :	Remove person to fresh air and keep comfortable for breathing. Get medical advice/attention if you feel unwell.
Skin contact :	Wash skin promptly. Wash with plenty of water/soap. If skin irritation or rash occurs, get medical advice/attention. Get medical advice/attention if you feel unwell.
Eye contact :	Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do - continue rinsing. Get medical advice/attention if eye irritation persists or if you feel unwell.
Ingestion :	Rinse mouth. Get medical advice/attention if you feel unwell.
Most important symptoms/effects, acute and delayed :	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 :	(See section 8. Exposure controls / personal protection)
Special precautions for physicians :	No information

### 5. Fire-fighting measures

Suitable extinguishing media :	This substance is does not burn itself. Use extinguishing media appropriate for surrounding fire situation.
Do not use extinguishing media :	No information
Specific hazards :	Fire may generate irritating or toxic gases.
Characteristic extinguishing methods :	Move the container from the region on fire if there is no danger. If it cannot be moved, cool it by sprinkling water around the container and its surroundings.
Protection of firefighters:	Wear appropriate air-breathing apparatus and chemical protective clothing when extinguishing fires. (See section 8. Exposure controls / personal protection)

### 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures :	Immediately isolate appropriate distances in all directions as leak areas. Prohibit the entrance except the person concerned. Workers must wear appropriate protective equipment (see section 8. Exposure controls / personal protection) and avoid contact with eyes and skin and inhalation. Stay upwind.
Environmental precautions:	Be careful not to be released into rivers, etc. and cause any adverse effects on the environment.
Methods and materials for containment and cleaning up :	Stop the leak if there is no danger.
Collection and neutralization:	Sweep up any leaks and collect in an empty container.
Preventing secondary accidents:	Treat diligently as it may slip on the floor.

## 7. Handling and storage

### Handling

Technical measures :	Take the equipment measures described in "8. Exposure controls/personal protection" and wear protective equipment. Described in "8. Exposure controls/personal protection" perform local exhaust and general ventilation.
Precautions for safe handling :	Do not contact, inhale or swallow. Avoid contact with eyes. Do not inhale dust and fumes. Wash hands thoroughly after handling. Use only outdoors or in a well-ventilated area. Avoid discharging into the environment.
Contact evasion :	See "10. Stability and reactivity" section.

### Storage

Safe storage conditions :	Store locked up. Technical measures : Storage areas should be provided with daylighting, lighting and ventilation facilities necessary to store or handle hazardous material.
Container and packing materials :	There are no restrictions on packaging and containers, but put in a sealed, strong and hard-to-break item.

## 8. Exposure controls/personal protection

Control concentration :	Not set
Tolerable concentration :	
Japan Society for Occupational Health (2025)	0.01mg/m <sup>3</sup> Silver and silver compounds (as Ag)
ACGIH (2024)	0.01mg/m <sup>3</sup> TLV-TWA Silver, and compounds. Soluble compounds, as Ag
Equipment measures :	Workplaces storing or handling this material should be equipped with an eyewash and safety shower. Exhaust ventilation should be provided to keep airborne concentrations below exposure limits. If dust and fumes are generated during the high heat process, install a ventilation system to keep air pollutants below the control concentration.
Protective Equipment	
Respiratory protection :	Wear suitable respiratory protective equipment if ventilation is inadequate. (Refer to JIS T8151 Particulate respirators, JIS T8152 Gas respirators, JIS T8155 Compressed air open-circuit self-contained breathing apparatus)
Hand protection :	Wear suitable protective gloves. (rubber gloves, etc.) (Refer to JIS T8116 Chemical protective gloves)
Eye protection :	Wear suitable eye protection (regular glasses, plain glasses with side plates, goggles). (Refer to JIS T8147 Protective Glasses)
Skin and body protection :	Wear suitable protective clothing, and protective boots, etc. (Refer to JIS T8115 Chemical Protective Clothing, JIS T8117 Chemical Protective Boots)

## 9. Physical and chemical properties

Physical state :	Powder
Color :	White or grey
Odor :	Odorless
Odor threshold :	No information
pH :	No information
Melting point/freezing 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

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
Decomposition temperature :	No information
Viscosity :	No information

## 10. Stability and reactivity

Reactivity :	No information
Chemical stability :	Stable substance under normal conditions.
Possibility of hazardous reactions :	Discolors black when exposed to on zone, hydrogen sulfide, and sulfur. Avoid contact with strong acids and strong bases. Acetylene forms impact sensitive compounds. Fine silver fragments and concentrated hydrogen peroxide solutions can explode (decompose violently to release oxygen gas). Explosive compounds may form on contact with ammonia during drying. Reacts easily with dilute nitric acid and concentrated sulfuric acid. This poses a fire hazard.
Conditions to avoided :	No information
Incompatible materials :	Strong acids, strong bases, concentrated hydrogen peroxide solutions, ammonia (when dry), dilute nitric acid, concentrated sulfuric acid.
Hazardous decomposition products :	No information

## 11. Toxicological information

Acute toxicity	
Oral :	Since the rat LD50 > 5,000mg / kg (HSDB (2003)), it was classified into "Not classified".
Dermal :	Since the rat LD50 > 2,000mg / kg (HSDB (2003)), it was classified into "Not classified".
Inhalation : Gases	The definition of GHS is a solid.
Inhalation : Vapours	The definition of GHS is a solid.
Inhalation : Dusts and mists	Classification is not possible due to lack of data.
Skin corrosions/irritation :	Testing on rabbits describes "Slightly Irritating (IUCLID (2000))", classification is not possible due to lack of data.
Serious eye damage/irritation :	Based on the description of mild irritation in rabbits and recovery in 48 hours (IUCLID (2000)), it was classified as eye irritation category 2B.
Respiratory organ sensitivity :	Classification is not possible due to lack of data.
Skin sensitivity :	Exposure to powder causes allergic contact dermatitis (ACGIH (7th, 2001)), and exposure to silver-containing accessories causes an allergic reaction (PATTY (5th, 2001)). Based on the above results, it was classified into Category 1 that may cause an allergic skin reaction.
Germ-cell mutagenicity :	Classification is not possible due to lack of data.
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)). Based on the above results, classification not possible.
Reproductive toxicity :	Classification is not possible due to lack of data.
Specific target organ 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)). Based on the above, it was classified as a respiratory disorder (Category 1).

Specific target organ toxicity (repeated exposure) :	Occupational exposure to powder causes silver poisoning (argyria) with pigmentation on the skin and mucous membranes (ACGIH (7th, 2001)) (PATTY (5th, 2001)), A statement that impaired night vision is a manifestation of dysfunction (ATSDR ToxFAQs (1997)). Based on the above, it was classified as Category 1 (eye). There was a statement that bronchitis had resulted from deposition in the lungs due to long-term inhalation of dust (PATTY (5th, 2001 HSDB (2003))), and it was classified into Category 1 (respiratory: inhalation). Based on the above, it was classified as a eye, respiratory (inhalation) damage due to long-term or repeated exposure (Category 1).
Aspiration hazard :	Classification is not possible due to lack of data.

## 12. Ecological information

### Toxicity

Hazardous to the aquatic environment (acute) :	Classification is not possible due to lack of data.
Hazardous to the aquatic environment (chronic) :	Classification is not possible due to lack of data.
Persistence and degradability :	No information
Bioaccumulative potential :	No information
Mobility in soil :	No information
Hazard to the ozone layer :	The materials concerned are not listed by an affiliated book of Montreal Protocol.

## 13. Disposal precautions

Residual waste :	Dispose in accordance with relevant laws and local government standards. Outsource to an industrial waste disposal contractor licensed by the prefectural governor, or if a local public entity does the disposal, outsource it there. If outsourcing waste disposal, thoroughly notify the disposal companies of the dangers and harmfulness before outsourcing.
Dirty containers and packaging :	Containers should be cleaned and recycled or disposed of properly in accordance with relevant laws and local government standards. When disposing of empty containers, completely remove the contents.

## 14. Transport information

### International regulations

UN No. :	No information
Proper shipping name :	No information
Class :	No information
Sub risk :	No information
Packing group :	No information
Marine pollutant (sea) :	Not applicable
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC code :	Not applicable

### Japanese regulations

Land regulations information :	Not applicable
Maritime regulations information :	Not applicable
Aviation regulations information :	Not applicable
Special safety measures :	When transporting, avoid direct sunlight, load containers without damage, corrosion, or leakage, and securely prevent collapse of cargo. Do not add heavy goods.

## 15. Regulatory information (Japanese law)

Industrial safety and health act :	Dangerous or Harmful Substances Subject to Be Indicated their Names (Article 57 of the act, Article 18 of the Cabinet Order, Appendix Table 9) Dangerous or Harmful Substances Whose Names, etc. Should Be Notified (Article 57-2 of the act, Article 18-2 of the Cabinet Order, Appendix Table 9) Dangerous or Harmful Substances for which a risk assessment should be conducted (Article 57-3 of the act) Chemicals causing skin or other disorders (Ordinance on industrial safety and health Article 594-2)
PRTR :	Class I designated chemical substance (Appended table 1 105 Silver and its water-soluble compounds.)
Air pollution control act	Hazardous air pollutants (45 of Central environment council 9th report)

\* Laws and regulations are examples and do not cover domestic laws and regulations.

## 16. Other information

References, etc. :	GHS classification results database: NITE website GHS model SDS information: JISHA website Ministry of health, labor and welfare website JIS Z7252 : 2019 JIS Z7253 : 2019 Selection Manual for Protective Equipment for Prevention of Skin Damage, etc. (Ministry of Health, Labour and Welfare Feb.2024 )
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### \*Caution:

Although hazard and harmfulness evaluations are based on the data and information available at the current time, they may not be sufficient.

Please handle with care.

Furthermore, the data and evaluations described herein are not in any way guaranteed. The descriptions refer to normal handling.

Regarding special handling, please handle based on the safety measures which are suitable for the intended applications and methods of use.

This SDS is an English translation of a document prepared in Japanese in accordance with JIS Z7253:2019.