

## 物質安全資料表(MSDS)

### 1 · Identification Of The Substance / Preparation And Company

- 1.1 Product Information: Nano-silver liquid
- 1.2 Another name: -
- 1.3 Recommend usage:
- 1.4 Information of Manufacturer or Supplier :  
GRACESS INTERNATIONAL CO., LTD. /  
29F-3, No. 86, Sec. 1, Beixin Rd., Xindian Dist., New Taipei City 231003, Taiwan /+886-2-2673-3998
- 1.5 Emergency Phone / Fax: +886-2-2673-3998 /+886-2-2673-3995

### 2. Hazards Identification data

- 2.1 Hazard Description: Chronic exposure affects skin, eyes and respiratory tract.  
May cause irritation to skin and eyes
- 2.2 NFPA Ratings (Scale 0-4):  
Health = 1  
Flammability = 0  
Reactivity = 0  
Potential Health Effects:  
Skin Contact: May cause irritation with redness and pain  
Eye Contact: May cause irritation, redness and pain  
Ingestion: See chronic effects  
Inhalation: See chronic effects  
Chronic Exposure:  
Prolonged or repeated inhalation, application or ingestion of silver and its compounds may cause a permanent bluish discoloration of the skin, eyes, and mucous membranes. This condition is called argyria. This effect can be either local or generalized. It appears that localized deposition occurs by penetration of fine, metallic particles and that generalized argyria occurs from inhalation or ingestion of silver salts. It is estimated that a gradual intake of 1 to 5g silver will lead to generalized argyria. Argyria of the eyes is not accompanied by vision loss although there may be some difficulty adapting to the dark.

There is some evidence for skin absorption. Repeated skin contact may also cause allergic contact dermatitis. Silver deposits in the respiratory tract may also cause a mild chronic bronchitis.

### 3. Identification data

English name: Nano-silver liquid		
Synonym name:		
Materials name	CAS Number	%
Silver	7440-22-4	0.1%
Polyvinylpyrrolidone	9003-39-8	0.2%
Water	7732-18-5	99.7%

### 4. First aid measure

- 4.1 Skin Contact: In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.
- 4.2 Eye Contact: Immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention if irritation persists.  
Ingestion: Give several glasses of water to drink to dilute. If large amounts were swallowed, get medical advice.  
Inhalation: Remove to fresh air. Get medical attention for any breathing difficulty.  
Serious Inhalation: Not available.
- 4.3 The most harmful effect:-

4.4 Protection of first-aid person: -

4.5 Suggestion to doctors: -

#### 5. Fire fighting measure

5.1 Fire: In water dried form, this material may ignite when exposed to flame or by reaction with incompatible materials.

5.2 Products of Combustion: These products are carbon oxides (CO, CO<sub>2</sub>), nitrogen oxides (NO, NO<sub>2</sub>...).

5.3 Explosion: Not considered to be an explosion hazard.

5.4 Suitable Extinguishing Agents: Use any means suitable for extinguishing surrounding fire. If material is burning, use dry powder.

5.5 Protective Equipment: Use protective clothing and breathing equipment appropriate for the surrounding fire.

#### 6. Accidental release measure:

6.1 Person-related safety precautions: Wear appropriate personal protective equipment as specified in Section 8. Ensure adequate ventilation. Keep away from ignition sources.

6.2 Measures for environmental protection: Do not allow material to be released to the environment without proper governmental permits.

6.3 Measures for cleaning/collecting: Ensure adequate ventilation. Keep away from ignition sources.

#### 7. Handling and storage:

7.1 Handling: Keep container tightly sealed. Store in cool, dry place in tightly closed containers. Ensure good ventilation at the workplace. Protect against physical damage.

7.2 Storage: Store in a cool location.

Further information about storage conditions: Keep container tightly sealed.  
Store in cool, dry conditions in well sealed containers.

#### 8. Exposure controls/personal protection:

8.1 Engineering controls: Use in laboratory hood or other ventilated device.

8.2 Exposure Controls: Use in laboratory hood or other ventilated device.

Use prudent laboratory practices for handling chemical substances of unknown toxicity.

Airborne Exposure Limits:

-OSHA Permissible Exposure Limit (PEL):

0.01 mg/m<sup>3</sup> for silver metal dust and fume as Ag

-ACGIH Threshold Limit Value (TLV):

0.1 mg/m<sup>3</sup> for silver metal

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded and engineering controls are not feasible, a half-face high efficiency particulate respirator (NIOSH type N100 filter) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece high efficiency particulate respirator (NIOSH type N100 filter) may be worn up to 50 times the exposure limit,

or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Skin Protection:** Wear protective gloves and clean body-covering clothing.

**Eye Protection:** Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

## 9. Physical and chemical properties:

- |                   |                                       |                              |                |
|-------------------|---------------------------------------|------------------------------|----------------|
| • Appearance:     | dark transparent aqueous solution     | • Flammability:              | Not flammable  |
| • Odor:           | Odorless                              | • Decomposition temperature: | Not determined |
| • Melting point:  | 960°C for Silver and 0°C for water    | • Explosion limits:          | Not determined |
| • Boiling point:  | 2212°C for Silver and 100°C for water | • pH:                        | 7              |
| • Density:        | approximately 1.0 g/cm <sup>3</sup>   | • Solubility in water:       | soluble        |
| • Vapor pressure: | Not determined                        | • Flash point:               | Not applicable |

## 10. Stability and activity:

10.1 Stability: Stable under normal temperatures and pressure.

10.2 Conditions to Avoid: Freezing

10.3 Hazardous Decomposition Products: May emit metallic fumes at high temperatures.

10.4 Hazardous Polymerization: Will not occur.

10.5 Incompatibilities: Not determined

## 11. Toxicological information

Toxicity to Animals(Polyvinylpyrrolidone): Acute oral toxicity (LD50): 40000 mg/kg [Mouse].

This product does not contain any compounds listed by NTP or IARC or regulated by OSHA as a carcinogen

## 12. Ecological information:

12.1 Environmental Fate: This material is not expected to significantly bioaccumulate.

12.2 Environmental Toxicity: No information found.

## 13. Disposal considerations:

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Although not a listed RCRA hazardous waste, this material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

14.1 International transport regulate: -

14.2 UN-number: -

14.3 Native transport name: -

- 14.4 Transport classification: -  
 14.5 Package classification: -  
 14.6 Marine pollutant (yes or no): -  
 14.7 Special transport way and precaution: avoid touch water.

## 15. Regulation

Suitable regulations:

1. \_\_\_\_\_ Chemical Inventory Status - Part 1 \_\_\_\_\_

Ingredient	TSCA	EC	Japan	Australia
Silver (7440-22-4)	Yes	Yes	No	Yes

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\_\_\_\_\_ Chemical Inventory Status - Part 2 \_\_\_\_\_

Ingredient	--Canada--			
	Korea	DSL	NDSL	Phil.
Silver (7440-22-4)	Yes	Yes	No	Yes

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2. \_\_\_\_\_ Federal, State & International Regulations - Part 1 \_\_\_\_\_

Ingredient	-SARA 302-		-----SARA 313-----	
	RQ	TPQ	List	Chemical Catg.
Silver (7440-22-4)	No	No	Yes	No

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\_\_\_\_\_ Federal, State & International Regulations - Part 2 \_\_\_\_\_

Ingredient	CERCLA	-RCRA-	-TSCA-
		261.33	8(d)
Silver (7440-22-4)	1000	No	No

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## 16. Other

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Form Maker	29F-3, No. 86, Sec. 1, Beixin Rd., Xindian Dist., New Taipei City 231003, Taiwan /+886-2-2673-3998
Date	20/03/2021

### LIMITED WARRANTY INFORMATION – PLEASE READ BEFORE ANY APPLICATION:

- The data presented in this brochure are in accordance with the present state of our knowledge but do not absolve the user from carefully checking all supplies immediately on receipt.
- We reserve the right to alter product constants within the scope of technical progress or new developments.
- The recommendations made in this brochure should be checked by preliminary trials because of conditions during processing over which we have no control, especially where other companies' raw materials are also being used.
- The information provided by us does not absolve the user from the obligation of investigating the possibility of infringement of third parties' rights or patents and, if necessary, clarifying the position.
- Recommendations for use do not constitute a warranty, either express or implied, of the fitness or suitability of the product for a particular purpose.
- We disclaim any responsibility for any dispute regarding product quality between agent and end user.

- Our sole warranty is that our products will meet the sales specifications in effect at the time of shipment.