

# GHS Safety Data Sheet

## STARSHIELD MS-SH4001+

### 1. IDENTIFICATION

#### A. Product name

- STARSHIELD MS-SH4001+

#### B. Recommended use and restriction on use

- General use : Electroconductive coating materials for shielding electromagnetic wave  
 - Restriction on use : Not available

#### C. Supplier information

- Company name : UKSEUNG CHEMICAL CO., LTD.  
 - Address : 174, Gaejwa-ro, Geumjeong-gu, Busan, Korea  
 - Telephone number : +82-070-4677-2624

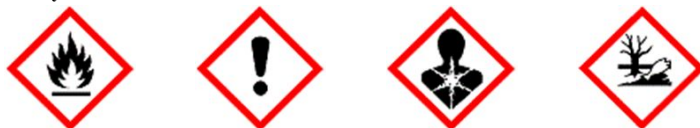
### 2. HAZARD IDENTIFICATION

#### A. GHS Classification

- Flammable liquids : Category2  
 - Serious eye damage/irritation : Category2A  
 - Skin sensitization : Category1  
 - Germ cell mutagenicity : Category1B  
 - Carcinogenicity : Category1A  
 - Reproductive toxicity : Category1A  
 - Specific target organ toxicity(Single exposure) : Category1  
 - Specific target organ toxicity(Single exposure) : Category3(Narcotic effects)  
 - Specific target organ toxicity(Single exposure) : Category3(Respiratory tract irritation)  
 - Specific target organ toxicity(Repeated exposure) : Category1  
 - Acute aquatic toxicity : Category1  
 - Chronic aquatic toxicity : Category1

#### B. GHS label elements

##### o Hazard symbols



##### o Signal words

- Danger

##### o Hazard statements

- H225 Highly flammable liquid and vapour  
 - H317 May cause an allergic skin reaction  
 - H319 Causes serious eye irritation  
 - H335 May cause respiratory irritation.  
 - H336 May cause drowsiness and dizziness.  
 - H340 May cause genetic defects  
 - H350 May cause cancer  
 - H360 May damage fertility or the unborn child  
 - H370 Causes damage to organs(Refer Section SDS 11)  
 - H372 Causes damage to organs through prolonged or repeated exposure (Refer Section SDS 11)  
 - H400 Very toxic to aquatic life  
 - H410 Very toxic to aquatic life with long lasting effects

○ **Precautionary statements**

**1) Prevention**

- P201 Obtain special instructions before use.
- P202 Do not handle until all safety precautions have been read and understood.
- P210 Keep away from heat/sparks/open flames/hot surfaces. ? No smoking.
- P233 Keep container tightly closed.
- P240 Ground/bond container and receiving equipment.
- P241 Use explosion-proof electrical/ventilating/lighting/equipment.
- P242 Use only non-sparking tools. Flammable liquids (chapter 2.6) 1, 2, 3
- P243 Take precautionary measures against static discharge.
- P260 Do not breathe dust/fume/gas/mist/vapours/spray.
- P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
- P264 Wash hands thoroughly after handling.
- P270 Do not eat, drink or smoke when using this product.
- P271 Use only outdoors or in a well-ventilated area.
- P272 Contaminated work clothing should not be allowed out of the workplace.
- P273 Avoid release to the environment.
- P280 Wear protective gloves/protective clothing/eye protection/face protection.
- P281 Use personal protective equipment as required.

**2) Response**

- P302+P352 IF ON SKIN: Wash with plenty of soap and water.
- P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
- P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P307+P311 If exposed: Call a POISON CENTER or doctor/physician.
- P308+P313 If exposed or concerned: Get medical advice/attention.
- P312 Call a POISON CENTER or doctor/physician if you feel unwell.
- P314 Get medical advice/attention if you feel unwell.
- P321 Specific treatment
- P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
- P337+P313 If eye irritation persists: Get medical advice/attention.
- P363 Wash contaminated clothing before reuse.
- P370+P378 In case of fire: Use Suitable extinguishing media for extinction(Refer Section MSDS 5).
- P391 Collect spillage.

**3) Storage**

- P403+P233 Store in a well-ventilated place. Keep container tightly closed.
- P403+P235 Store in a well-ventilated place. Keep cool.
- P405 Store locked up.

**4) Disposal**

- P501 Dispose of contents/container in accordance with local/regional/national/international regulation

**C. Other hazards which do not result in classification : (NFPA Classification)**

○ **NFPA grade (0 ~ 4 level)**

- Health : 2, Flammability : 3, Reactivity : 0

**3. COMPOSITION/INFORMATION ON INGREDIENTS**

Chemical Name	Trade names and Synonyms	CAS No.	Content(%)
Ethanol	Alcohol anhydrous	64-17-5	30~50
Copper	Copper concentrate	7440-50-8	15~25
Silver	Argentium	7440-22-4	5~15
2-Propanol	Isopropanol	67-63-0	< 5
Acetic acid ethyl ester	Ethyl acetate	141-78-6	< 5
N-methylpyrrolidone	N-Methyl-alpha-pyrrolidinone	872-50-4	< 5

#### 4. FIRST AID MEASURES

##### A. Eye contact

- Do not rub your eyes.
- Immediately flush eyes with plenty of water for at least 15 minutes and call a doctor/physician.
- Get medical attention immediately.
- Go to the hospital immediately if symptoms (flare, irritate) occur.
- Remove contact lenses if worn.

##### B. Skin contact

- Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
- Laundering enough contaminated clothing before reuse.
- Get medical attention immediately.
- Go to the hospital immediately if symptoms (flare, irritate) occur.
- Remove contaminated clothing, shoes and isolate.
- Wash thoroughly after handling.
- Wear gloves when washing the patient, and please avoid contact with contaminated clothing.

##### C. Inhalation contact

- When exposed to large amounts of steam and mist, move to fresh air.
- Take specific treatment if needed.
- Get medical attention immediately.
- If breathing is stopped or irregular, give artificial respiration and supply oxygen.

##### D. Ingestion contact

- About whether I should induce vomiting Take the advice of a doctor.
- Rinse your mouth with water immediately.
- Get medical attention immediately.

##### E. Delayed and immediate effects and also chronic effects from short and long term exposure

- Not available

##### F. Notes to physician

- Notify medical personnel of contaminated situations and have them take appropriate protective measures.
- If exposed or concerned, get medical attention/advice.

#### 5. FIREFIGHTING MEASURES

##### A. Suitable (Unsuitable) extinguishing media

- Dry chemical, carbon dioxide, regular foam extinguishing agent, spray
- Avoid use of water jet for extinguishing

##### B. Specific hazards arising from the chemical

- Not available

##### C. Special protective actions for firefighters

- Keep unauthorized personnel out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- Notify your local fire station and inform the location of the fire and characteristics hazard.
- Using a unattended and water devices in case of large fire and leave alone to burn if you do not imperative.
- Avoid inhalation of materials or combustion by-products.
- Keep containers cool with water spray.
- Due to the extremely low flash point, irrigating fire extinguishing may be less effective when put out a fire.

#### 6. ACCIDENTAL RELEASE MEASURES

##### A. Personal precautions, protective equipment and emergency procedures

- Ventilate closed spaces before entering.

- Do not touch spilled material. Stop leak if you can do it without risk.
- Move container to safe area from the leak area.
- Remove all sources of ignition.
- Avoid skin contact and inhalation.
- Cleanup and disposal under expert supervision is advised.
- Keep unauthorized people away, isolate hazard area and deny entry.

### B. Environmental precautions

- Prevent runoff and contact with waterways, drains or sewers.
- If large amounts have been spilled, inform the relevant authorities.

### C. Methods and materials for containment and cleaning up

- Large spill : Stay upwind and keep out of low areas. Dike for later disposal.
- Notification to central government, local government. When emissions at least of the standard amount
- Dispose of waste in accordance with local regulation.
- Appropriate container for disposal of spilled material collected.
- Avoid entering to sewers or water system.
- Do not use plastic containers.
- Prevent the influx to waterways, sewers, basements or confined spaces.
- Spilled material should be treated as a potential risk of waste collected.

## 7. HANDLING AND STORAGE

### A. Precautions for safe handling

- Avoid direct physical contact.
- Comply with all applicable laws and regulations for handling
- Do not handle until all safety precautions have been read and understood.
- Operators should wear antistatic footwear and clothing.
- Avoid contact with heat, sparks, flame or other ignition sources.
- Contaminated work clothing should not be allowed out of the workplace.

### B. Conditions for safe storage, including any incompatibilities

- Store in cool, dry and well ventilated place.
- Check regularly for leaks.
- Do not use damaged containers.
- Observe applicable laws and regulations.
- Please pay attention to incompatibilities materials and conditions to avoid.
- By specifying a storage area for carcinogenic substances.
- Collect them in sealed containers.
- Store away from water and sewer.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### A. Exposure limits

#### o ACGIH TLV

- [Ethanol] : STEL, 1000 ppm (1880 mg/m<sup>3</sup>)
- [Copper] : TWA, 0.2 mg/m<sup>3</sup> (Fume, as Cu), TWA, 1 mg/m<sup>3</sup> (Dusts and Mists, as Cu)
- [Silver] : TWA 0.1 mg/m<sup>3</sup>-Metal dust and fume, TWA 0.01 mg/m<sup>3</sup>-Soluble compounds, as Ag
- [2-Propanol] : TWA, 200 ppm (491 mg/m<sup>3</sup>), STEL, 400 ppm (984 mg/m<sup>3</sup>)
- [Acetic acid ethyl ester] : TWA, 400 ppm (1440 mg/m<sup>3</sup>)

#### o OSHA PEL

- [Acetic acid ethyl ester]:400ppm 1400mg/m<sup>3</sup>
- [Ethanol]:1000ppm 1900mg/m<sup>3</sup>
- [2-Propanol]:400ppm 980mg/m<sup>3</sup>
- [Silver]: 0.01mg/m<sup>3</sup>
- [Copper]: 0.1 mg/m<sup>3</sup> (Fume), 1 mg/m<sup>3</sup> (Dusts and mists)

**B. Engineering controls**

- A system of local and/or general exhaust is recommended to keep employee exposures above the 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. The use of local exhaust ventilation is recommended to control emissions near the source.

**C. Individual protection measures, such as personal protective equipment**○ **Respiratory protection**

- Under conditions of frequent use or heavy exposure, Respiratory protection may be needed.
- Respiratory protection is ranked in order from minimum to maximum.
- Consider warning properties before use.

○ **Eye protection**

- Wear primary eye protection such as splash resistant safety goggles with a secondary protection face shield.
- Provide an emergency eye wash station and quick drench shower in the immediate work area.

○ **Hand protection**

- Wear appropriate chemical resistant glove.

○ **Skin protection**

- Wear appropriate chemical resistant protective clothing.

○ **Others**

- Not available

**9. PHYSICAL AND CHEMICAL PROPERTIES**

A. Appearance	
- Appearance	Other
- Color	Not available
B. Odor	Not available
C. Odor threshold	Not available
D. pH	Not available
E. Melting point/Freezing point	Not available
F. Initial Boiling Point/Boiling Ranges	Not available
G. Flash point	Not available
H. Evaporation rate	Not available
I. Flammability(solid, gas)	Not available
J. Upper/Lower Flammability or explosive limits	Not available
K. Vapour pressure	Not available
L. Solubility	Not available
M. Vapour density	Not available
N. Specific gravity(Relative density)	Not available
O. Partition coefficient of n-octanol/water	Not available
P. Autoignition temperature	Not available
Q. Decomposition temperature	Not available
R. Viscosity	Not available
S. Molecular weight	Not available

**10. STABILITY AND REACTIVITY****A. Chemical Stability**

- This material is stable under recommended storage and handling conditions.

**B. Possibility of hazardous reactions**

- Cylinders exposed to fire may vent and release flammable gas.

**C. Conditions to avoid**

- Avoid contact with incompatible materials and condition.
- Avoid : Accumulation of electrostatic charges, Heating, Flames and hot surfaces
- Avoid contact with heat, sparks, flame or other ignition sources.

**D. Incompatible materials**

- Not available

**E. Hazardous decomposition products**

- May emit flammable vapour if involved in fire.

**11. TOXICOLOGICAL INFORMATION****A. Information on the likely routes of exposure**

- **(Respiratory tracts)**
  - May cause respiratory irritation.
- **(Oral)**
  - Not available
- **(Eye/Skin)**
  - Causes serious eye irritation
  - May cause an allergic skin reaction

**B. Delayed and immediate effects and also chronic effects from short and long term exposure**

- **Acute toxicity**
  - \* **Oral**
    - [Ethanol] : LD50 = 6200 mg/kg Rat
    - [Silver] : LD50 > 5000 mg/kg Rat
    - [2-Propanol] : LD50 = 4710mg/kg Rat
    - [Acetic acid ethyl ester] : LD50 5620 mg/kg Rat
    - [N-methylpyrrolidone] : LD50 = 7725 mg/kg Rat (Oral)
  - \* **Dermal**
    - [Silver] : LD50 > 2000 mg/kg Rat
    - [2-Propanol] : LD50 = 12870 mg/kg rabbit
    - [Acetic acid ethyl ester] : LD50 > 18000 mg/kg Rabbit
    - [N-methylpyrrolidone] : LD50 = 5000 mg/kg Rat
  - \* **Inhalation**
    - [Ethanol] : LC50 = 59.59 mg/L/4hr Rat
    - [2-Propanol] : LC50 = 72600 mg/ℓ 4 hr Rat
    - [Acetic acid ethyl ester] : Steam LC50 100 mg/ℓ 4 hr Rat (LC50 = 200 mg/L/1hr conversion  $\frac{1}{2}$ )
- **Skin corrosion/irritation**
  - Not available
- **Serious eye damage/irritation**
  - Causes serious eye irritation
- **Respiratory sensitization**
  - Not available
- **Skin sensitization**
  - May cause an allergic skin reaction
- **Carcinogenicity**
  - \* **IARC**
    - [Ethanol] : Group 1 (Ethanol in alcoholic beverages)
    - [2-Propanol] : Group 3
  - \* **OSHA**
    - Not available
  - \* **ACGIH**
    - [Ethanol] : A3 (Ethanol in alcoholic beverages)
    - [2-Propanol] : A4
  - \* **NTP**
    - Not available
  - \* **EU CLP**
    - Not available
- **Germ cell mutagenicity**
  - May cause genetic defects
- **Reproductive toxicity**

- May damage fertility or the unborn child
- **STOT-single exposure**
  - Causes damage to organs(Refer Section SDS 11)
  - May cause drowsiness and dizziness.
  - May cause respiratory irritation.
- **STOT-repeated exposure**
  - Causes damage to organs through prolonged or repeated exposure (Refer Section SDS 11)
- **Aspiration hazard**
  - Not available

## 12. ECOLOGICAL INFORMATION

### A. Ecotoxicity

- **Fish**
  - [Ethanol] : LC50 = 42 mg/ℓ 96 hr *Oncorhynchus mykiss*
  - [Copper] : LC50 = 0.37 mg/ℓ 96 hr
  - [Silver] : LC50 = 58 mg/ℓ 96 hr
  - [2-Propanol] : LC50 > 100 mg/ℓ 96 hr
  - [Acetic acid ethyl ester] : LC50 230 mg/ℓ 96 hr *Pimephales promelas*
  - [N-methylpyrrolidone] : LC50 = 832 mg/ℓ 96 hr
- **Crustaceans**
  - [Ethanol] : EC50 = 2 mg/ℓ 48 hr *Daphnia magna*
  - [Copper] : EC50 = 0.0318 mg/ℓ 48 hr
  - [Acetic acid ethyl ester] : EC50 717 mg/ℓ 48 hr *Daphnia magna*
  - [N-methylpyrrolidone] : LC50 = 1.23 mg/ℓ 48 hr
- **Algae**
  - [Copper] : LC50 = 0.092 mg/ℓ 15 hr
  - [2-Propanol] : EC50 = 2.2 mg/ℓ 96 hr
  - [Acetic acid ethyl ester] : EC50 1800 ~ 3200 mg/ℓ 72 hr (*Selenastrum sp.*)
  - [N-methylpyrrolidone] : EC50 > 500 mg/ℓ 72 hr

### B. Persistence and degradability

- **Persistence**
  - [Copper] : log Kow = -0.57 (Estimates)
  - [Acetic acid ethyl ester] : log Kow 0.73
  - [N-methylpyrrolidone] : log Kow = -0.54
- **Degradability**
  - [Ethanol] : BOD5/COD = 0.57
  - [Acetic acid ethyl ester] : BOD5/COD 0.81
  - [N-methylpyrrolidone] : BOD5/COD = 0.68

### C. Bioaccumulative potential

- **Bioaccumulative potential**
  - [Copper] : BCF = 5830
  - [Acetic acid ethyl ester] : BCF 30
  - [N-methylpyrrolidone] : BCF = 0.16
- **Biodegradation**
  - [Ethanol] : Biodegradability = 75 (%) 20 day (Aerobic, Other, Easily decomposed)
  - [Acetic acid ethyl ester] : 100 (%) 28 day
  - [N-methylpyrrolidone] : Biodegradability = 73 (%) 28 day

### D. Mobility in soil

- [Ethanol] : Koc = 1

### E. Other adverse effects

- Not available

### 13. DISPOSAL CONSIDERATIONS

#### A. Disposal methods

- Since more than two kinds of designaed waste is mixed, it is difficult to treat seperatly, then can be reduction or stabilization by incineration or similar process.
- If water separation is possible, pre-process with Water separation process.
- Dispose by incineration.

#### B. Special precautions for disposal

- The user of this product must disposal by oneself or entrust to waste disposer or person who other's waste recycle and dispose, person who establish and operate waste disposal facilities.
- Dispose of waste in accordance with all applicable laws and regulations.

### 14. TRANSPORT INFORMATION

#### A. UN No. (IMDG)

- 1993

#### B. Proper shipping name

- Flammable liquids, n.o.s.

#### C. Hazard Class

- 3

#### D. IMDG Packing group

- II

#### E. Marine pollutant

- Applicable

#### F. Special precautions for user related to transport or transportation measures

- Local transport follows in accordance with Dangerous goods Safety Management Law.
- Package and transport follow in accordance with Department of Transportation (DOT) and other regulatory agency requirements.
- EmS FIRE SCHEDULE : F-E (Non-water-reactive flammable liquids)
- EmS SPILLAGE SCHEDULE : S-E (Flammable liquids, floating on water)

### 15. REGULATORY INFORMATION

#### A. National and/or international regulatory information

- POPs Management Law
  - Not applicable
- Information of EU Classification
  - \* Classification
    - [Ethanol] : F; R11
    - [2-Propanol] : F; R11 Xi; R36 R67
    - [Acetic acid ethyl ester] : F; R11 Xi; R36 R66 R67
    - [N-methylpyrrolidone] : Repr. Cat. 2; R61, Xi; R36/37/38
  - \* Risk Phrases
    - [Ethanol] : R11
    - [2-Propanol] : R11, R36, R67
    - [Acetic acid ethyl ester] : R11, R36, R66, R67
    - [N-methylpyrrolidone] : R61, R36/37/38
  - \* Safety Phrase
    - [Ethanol] : S2, S7, S16
    - [2-Propanol] : S2, S7, S16, S24/25, S26
    - [Acetic acid ethyl ester] : S2, S16, S26, S33
    - [N-methylpyrrolidone] : S53, S45
- U.S. Federal regulations
  - \* OSHA PROCESS SAFETY (29CFR1910.119)
    - Not applicable



- \* **CERCLA Section 103 (40CFR302.4)**
  - [Copper] : 2267.995 kg 5000 lb
  - [Silver] : 453.599 kg 1000 lb
  - [Acetic acid ethyl ester] : 2267.995 kg 5000 lb
- \* **EPCRA Section 302 (40CFR355.30)**
  - Not applicable
- \* **EPCRA Section 304 (40CFR355.40)**
  - Not applicable
- \* **EPCRA Section 313 (40CFR372.65)**
  - [Copper] : Applicable
  - [Silver] : Applicable
  - [2-Propanol] : Applicable
  - [N-methylpyrrolidone] : Applicable
- o **Rotterdam Convention listed ingredients**
  - Not applicable
- o **Stockholm Convention listed ingredients**
  - Not applicable
- o **Montreal Protocol listed ingredients**
  - Not applicable

## 16. OTHER INFORMATION

### A. Reference

- The information contained herein is believed to be accurate. It is provided independently of any sale of the product for purpose of hazard communication. It is not intended to constitute performance information concerning the product. No express warranty, or implied warranty of merchantability or fitness for a particular purpose is made with respect to the product or the information contained herein.
- This Safety Data Sheet was compiled with data and information from the following sources: KOSHA, NITE, ESIS, NLM, SIDS, IPCS

### B. Issue date

- 2008-01-01

### C. Revision number and Last date revised

- 1 times, 2013-04-13

### D. Other

- This SDS is prepared according to the Globally Harmonized System (GHS).