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|----------------------------------------------------------------|-------------------------------------|
| <b>WONIL</b>                                                   | <b>Material Safety Data Sheet</b>   |
| Wonil's MSDS No : 0009<br>Revision No : 4<br>(Standard of GHS) | Revision Data : 01/10/14            |
| <b>Product name</b>                                            | <b>PHOSPHORUS DEOXIDIZED COPPER</b> |

**SECTION 1 Information of company and chemical products**

1. Product name PHOSPHORUS DEOXIDIZED COPPER
- Standard of goods C1220
2. Recommendation and limit of use for product
- The use of recommendation Electricity, Building, Chemistry, heat exchanger, boiler, other parts etc.
- Limit of use No data
3. Manufacturer/Importer/Distribution dealer information
- Company name WONIL CO.,LTD
- Address 602-22, 647 Sunggok-Dong, Danwon-Gu, Ansan, Kyunggi-Do, Korea
- Contact TEL: 031) 491 - 2891 / FAX: 031) 491 - 5012
- Responsibility Department Quality Management Dpt.

**SECTION 2 Hamfulness·Dangerousness**

1. Classification of Hamfulness, Dangerousness
- Specific target extended toxicity (Once Exposure) : Division 3- Respiratory organ Stimulation.
- Specific target extended toxicity (Repetition Exposure) : Division 1
- Acute aquatic environment hamfulness : Division 1
- Chronic aquatic environment hamfulness : Division 1

2. Warning signs Item includes prevention measure words

Pictorial symbol



|                          |                                                                                                                                                                                                                                     |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Signal words             | Danger                                                                                                                                                                                                                              |
| Harmful, dangerous Words | H335 It can cause Stimulation of Breathing device<br>H372 It causes liver damage from long period and repeated exposure<br>H400 Highly toxic for aquatic organisms<br>H410 Highly toxic for aquatic organisms by long period effect |

Prevention measure words

|            |                                                                                                                                                      |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Prevention | P260 Do not breathe Dust · Fume.<br>P264 After treatment, wash your hands thoroughly.<br>P270 Do not eat, drink and smoke when you use this product. |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------|

|        |                                                                                                                                                                                                                                                               |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Action | P304+P340 Move to place where there is fresh air and take a rest with comfortable posture if you breath dust.<br>P312 If you feel uncomfortable, consult a doctor(Medical institution).<br>P314 If you feel uncomfortable, ask for medical action and advice. |
| Save   | P403+P223 Save it as covering tightly with wrap to a well-ventilated place.                                                                                                                                                                                   |
| Disuse | P501 Discard contents (Following Waste Control Act) discard contents and containers.                                                                                                                                                                          |

3. Other harmful, dangerousness (NFPA) which is not included in standard of harmful, dangerousness

|          |             |      |            |
|----------|-------------|------|------------|
| Division | Health care | Fire | Reactivity |
| Copper   | 2           | 3    | 0          |

**SECTION 3**

**Title and content of Constituent**

| Material Name | Usual name | CAS No.   | content (%)     |
|---------------|------------|-----------|-----------------|
| Copper        | -          | 7440-50-8 | 99.900 ~ 99.985 |

**SECTION 4**

**Emergency Action Knack**

|                                        |                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. When Dust(Fume) comes into your eye | Wash your eye with much water over 15 minutes if your eye contact chemicals.<br>Consult a doctor's medical examination and treatment immediately, if chemicals comes into your eye.                                                                                                                                                                        |
| 2. When Dust(Fume) contact your skin   | Wash your skin with soap water over 15 minutes immediately and remove chemicals.<br>If skin disease is occurred, consult a doctor's medical examination.                                                                                                                                                                                                   |
| 3. When you breathe Dust(Fume)         | If there is no breathing, start artificial respiration.<br>Walk away from Source of exposure.                                                                                                                                                                                                                                                              |
| 4. When you eat Dust(Fume)             | If people is insensible, avoid to vomit up and forbid all intake.<br>When occur natural vomit, adopt a lower posture than behind of head to avoid possibility of breathe to lung.<br>If people is insensible, prevent respiratory obstruction as turning the head.<br>Call the 119 or Emergency medical treatment center and evacuate patient immediately. |
| 5. Other caution of a doctor           | Consider gastric lavage when you take in chemicals.<br>Consider offering oxygen when people cannot breathe.<br>Antidote(Copper) : kalium, Natrium, Edetate/Glucose , Vein Injection: Penicillamine, oral administration.                                                                                                                                   |

**SECTION 5**

**Coping Method of Explosion and Fire**

1. Proper(Improper) fire extinguish material

|                              |                                                                                                               |
|------------------------------|---------------------------------------------------------------------------------------------------------------|
| Proper extinguish material   | Dolomite , Dry chemical extingish material for Metal fire, Sand, Black lead, soda ash, sodium chloride , lime |
| Improper extinguish material | Direct water jet                                                                                              |

|                             |         |
|-----------------------------|---------|
| When great fire is occurred | No data |
|-----------------------------|---------|

2. Particular harmfulness from Chemical material

|                           |                                                                                                              |
|---------------------------|--------------------------------------------------------------------------------------------------------------|
| Pyrolysate                | Lead oxide, Zinc oxide                                                                                       |
| Danger of Fire, Explosion | People can ignore danger of fire and explosion in common states.<br>Mixture of Dust and Air can be exploded. |

3. The protector and Prevention measure during suppression of fire

|                    |                                                                                                                                                                                                                                                  |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Protector          | Fire suits                                                                                                                                                                                                                                       |
| Prevention measure | Keep off related person and forbid to enter isolating danger place.<br>Use extinguish material which is adjusted by round the fire.<br>Avoid to breathe material if self or product of combustion.<br>Do not contact water directly to material. |

**SECTION 6 Coping method during leakage accident**

|                                                        |                                                                                                              |
|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| 1. Matters of management and protector to protect body | Avoid direct contact and wear protection equipment.<br>Do not touch your hand and contact to leak substance. |
|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|

2. Matters of management to protect environment

|             |                                                                                                                                                                          |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Atmosphere  | No data                                                                                                                                                                  |
| Soil        | Dispose of leaked material moving suitable container.                                                                                                                    |
| Under Water | Remove trapped material with absorption using exhaust hose.<br>Do Adsorption treatment leaked material with activated carbon.<br>Refuse leaked material using a machine. |

3. Method of removal or purification

|                               |                                                                                                                                                                                                                                                          |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Small amount of material leak | Refuse leaked material to shitable containers for later disposal.                                                                                                                                                                                        |
| Large amount of material leak | Quarantine exposure place and contol access except related person.<br>Notice emission content to government ministry or local government when the material is emited more than a standard amount.<br>Remove all ignition source like Fire, Flare, Spark. |

**SECTION 7 Method of Treatment and Storage**

|                        |                                                                                                                                                                                          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Safe handling tips  | Prevent occurrence or scattering of Dust.                                                                                                                                                |
| 2. Safe storage method | Use and store following regulations and rules of government ministry or local government.<br>Save storage location with a locking device.<br>Avoid to contact with strong acid material. |

**SECTION 8 Prevent of esposure and Personal protector**

1. Exposure standard of chemicals, biological etc.

Exposure standard of chemicals (internal regulations)

|        |                                                                                                                                         |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Copper | Copper (Dust or Mist)TWA - 1mg/m <sup>3</sup> Copper (Dust or Mist)STEL - 2mg/m <sup>3</sup><br>Copper (Fume)TWA - 0.1mg/m <sup>3</sup> |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------|

Exposure standard of chemicals (Regulation of ACGIH)

|        |                                                                                                   |
|--------|---------------------------------------------------------------------------------------------------|
| Copper | TWA 0.2 mg/m <sup>3</sup> , 1 mg/m <sup>3</sup><br>Copper (Fume), Copper (Dusts and mists, as Cu) |
|--------|---------------------------------------------------------------------------------------------------|

Exposure standard of biological      Copper      No data

2. Proper Engineering Management

|                        |                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Engineering Management | Install ventilator furnished explosion-proof electric installation in case there is possibility of explosion risk of consistency.<br>Check work process which is proper to standard of permission and Exposure standards of Ministry of Labor.<br>Install ventilator like local ventilation system and manage to maintain optimal velocity control of local exhaust. |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

3. Personal protective equipment

|                              |                                                                                                                                                                                                                                  |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Respiratory organ Protection | Do not need protection for breathe in common situation, but wear protection for breath which is certified by Korea Occupational Safety and Health Agency when Dust and Fume are occurred from specific change of work condition. |
| Eye Protection               | Install urgent cleaning facilities and wash facilities for worker to use easily.<br>Wear safety glasses to protect eyes from missile.                                                                                            |
| Hand Protection              | Wear hand protection to avoid direct contact.                                                                                                                                                                                    |
| Body Protection              | Wear protective clothing which can prevent exposure in case there is direct skin exposure.                                                                                                                                       |

**SECTION 9      Characteristic of physicochemical**

1) Copper

|                 |          |                                                          |                  |
|-----------------|----------|----------------------------------------------------------|------------------|
| 1. Appearance   |          | 10. Ignition or upper and lower bound of Explosion range | No data          |
| Temper          | Solid    | 11. Steam pressure                                       | No data          |
| Color           | Red      | 12. Solubility                                           | (Insolubility)   |
| 2. Smell        | Odorless | 13. Vapor density                                        | No data          |
| 3. Smell degree | No data  | 14. Specific gravity                                     | 8.8 (Water=1)    |
| 4. pH           | No data  | 15. n-1-octanol/Coefficient division of water            | -0.57(Estimated) |

|                                  |         |                                        |         |
|----------------------------------|---------|----------------------------------------|---------|
| 5. Melting/Freezing point        | 1183 °C | 16. Spontaneous combustion temperature | No data |
| 6. Early boiling point and range | 2595 °C | 17. Decomposition temperature          | No data |
| 7. Flashing point                | No data | 18. Viscosity                          | No data |
| 8. Evaporating rate              | No data | 19. Molecular weight                   | 63.55   |
| 9. flammability<br>(Solid, Gas)  | No data |                                        |         |

**SECTION 10 Safety and Reactivity**

|                                                         |                                                                                                                             |
|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| 1. Possibility of chemical safety and hamful reactivity | It is clam in ordinary temperature and pressure.<br>Microscopic substances can be reacted with water.<br>No polymerization. |
| 2. Condition to avoid                                   | Inhibit occurring of dust.<br>Avoid Heat, Flame, Spark and other ignition source .                                          |
| 3. Material to avoid                                    | Peroxides , Metals, Halogen , Ammine.                                                                                       |
| 4. Hamful substance which is created during decomposing | Pyrolysate: Other decomposition product                                                                                     |

**SECTION 11 Information about Toxicity**

가. Information of High possibility of exposure course Copper

|                 |         |
|-----------------|---------|
| Exposure course | No data |
|-----------------|---------|

나. Information of health hanfulness

Acute toxicity Copper

|      |                                 |
|------|---------------------------------|
| Oral | LD50 11.5 mg/kg Rat(Phosphorus) |
|------|---------------------------------|

|                                        |                                |
|----------------------------------------|--------------------------------|
| Percutaneous                           | LD50 100 mg/kg Rat(Phosphorus) |
| Breathe                                | No data                        |
| Skin corrosivity or Magnetic polarity  | Nonirritation(Phosphorus)      |
| Severe eye damage or Magnetic polarity | No data                        |
| Respiratory organ hypersensitiveness   | No data                        |
| Skin hypersensitiveness                | No data                        |

Carcinogenicity

Copper

|                                                             |                                       |
|-------------------------------------------------------------|---------------------------------------|
| Occupation safety and health acts                           | No data                               |
| Ministry of Labor announcement                              | No data                               |
| IARC                                                        | No data                               |
| OSHA                                                        | No data                               |
| ACGIH                                                       | A4(Sn)                                |
| NTP                                                         | No data                               |
| Germ cell mutagenicity                                      | No data                               |
| Reproduction-toxicity                                       | No data                               |
| Specific target long-term toxicity (Exposure at once)       | Irritate upper airway(Copper)         |
| Specific target long-term toxicity (Exposure at Repeatedly) | appear liver injury to people(Copper) |
| Absorption hamfulness                                       | No data                               |

SECTION 12

Environmental impact

1. Ecotoxicology

Copper

|            |                        |
|------------|------------------------|
| Fish       | LC50 0.37 mg/ℓ 96 hr   |
| Crustacean | EC50 0.0318 mg/ℓ 48 hr |
| Birds      | LC50 0.092 mg/ℓ 15 hr  |

2. Persistent and Resolvability

Copper

|               |                            |
|---------------|----------------------------|
| Persistent    | log Kow -0.57 (Estimation) |
| Resolvability | No data                    |

3. Biological magnification

Copper

|               |          |
|---------------|----------|
| Magnification | BCF 5830 |
| Biodegradable | No data  |

4. Soil Portability

No data

5. Other Hanful effect

No data

**SECTION 13 Caution of Disuse**

|                      |                                                                                                                                                                    |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Method of disuse  | Classify Waste under Wastes Control Act and Handling following their characteristic<br>Treat the content by company which has permission under Wastes Control Act. |
| 2. Caution of disuse | Follow detailed standard and method of collection, transportation, storage, treatment under Wastes Control Act.                                                    |

**SECTION 14 Information for Transportation**

1. UN No.

|        |      |
|--------|------|
| Copper | 3089 |
| ZINC   | 1436 |

2. Proper Vessel name No data

3. Risk Rank of Transportation

|        |     |
|--------|-----|
| Copper | 4.1 |
| ZINC   | 4.3 |

4. Contaners grade

|        |    |
|--------|----|
| Copper | II |
| ZINC   | I  |

5. Marine pollutant No data

6. User need to know transportation or transportation methods or need Special safty measure

Emergency procedure in Fire

|        |     |
|--------|-----|
| Copper | F-G |
|--------|-----|

Emergency procedure in spill

|        |     |
|--------|-----|
| Copper | S-G |
|--------|-----|

**SECTION 15 Mandatory control present condition**

1. Regulation of occupation safety and health acts

|        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Copper | Control target material : Regulation of asterisk 7 about sanitation of industry<br>Working environment measurement Material (Period measuring method : 6 month) : Occupation safety and health acts asterisk 11- 4<br>Special health check material (Cycle diagnosis : 12month) : Occupation safety and health acts asterisk 12-2<br>Standard of exposure setting material : Standard exposure of Chemiclas or Physical Parameters (Ministry of Labor announcement 2008-26) |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

2. Regulation of Toxic Chemicals Control Act Notapplicable

3. Regulation of Safety Control of Dangerous Subs Notapplicable

4. Regulation of Wastes Control Act Notapplicable

5. Other Domestic or overseas regulation No data

**SECTION 16 Other reference**



1. Source of data
1. National Environmental Research, the chemical information system: (NCIS)
  2. The headquarters countries dangerous goods information system
  3. In- company Testing data analysis(Wonil Quality Management team)
  4. Reference chemical exposure, the Ministry of labor research program (2005)
  5. Other related regulation and announcement data
2. First date of preparation 2006. 04. 17.
3. Number of revision and the final revision date
- |                     |               |
|---------------------|---------------|
| Number of revision  | 4             |
| Final revision date | 2014. 01. 10. |
4. Etc.
- This Material Safety Data Sheet(MSDS) is completed by using MSDS Editing Program which is from Korea Occupational Safety and Health Agency matching the standard of (Ministry of Labor announcement 2009-68, 2009.10.26) GHS(Globally Harmonized System of Classification and Labelling of Chemicals) as following chemical material classification · expression and standard of material safety data sheet.
- This data does not vouch for quality of product and describe about treatment of safty, health, environment matters as usual states. Please use material after checking additory Safety and Health issues if temper is changed by heat or treatment under method of use.
- also, this data can be revised without notice, and can be offered via our website ([www.wonil.co.kr](http://www.wonil.co.kr)). Please contact our Quality management team for other detailed issues.