WONIL	Material Safety Data Sheet
Wonilsa MSDS No : 0009 Revision No : 4 (Standard of GHS)	Revision Data : 01/10/14
Product name	COPPER-IRON ALLOY

SECTION 1 Company and chemical products information

1. Product name — COPPER-IRON ALLOY

   Standard of goods — C19400

2. Recommendation and limit of use for product

   The use of recommendation — Lead frame, Electricity, Electricity 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 Hafulness, Dangerousness — Acute toxicity (Oral) : Division 4

   Specific target extended toxicity (Once Exposure) : Division 3- Stimulation of Breathing device

   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 H372 It causes liver damage from long period and repeated exposure H400 Highly toxic for aquatic organisms H410 Highly toxic for aquatic organisms by long period effect

Prevention measure words

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

Action	P301+P310 If you feel uncomfortable when you swallow, take the medical institution. P302+P352 Wash your skin with soap and much water if dust gets on skin. 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 contects (Folloing Waste Control Act) discard contents and containers.

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

Division	Health care	Fire	Reactivity
Copper	2	3	0
Iron	1	3	0

SECTION 3 Title and content of Composition

Material Name	Usual name	CAS No.	content (%)
Copper	-	7440-50-8	97 ~ 98
Iron	-	7439-89-6	0.001 ~ 2.6

SECTION 4 Emergency Action

1. When Dust(Fume) comes into your eye	Wash your eye with much water over 15 minutes if your eye contact chemicals. 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. 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. Walk away from Source of exposure.
4. When you eat Dust(Fume)	If people is insensible, avoid to vomit up and forbid all intake. When occur natural vomit, adopt a lower posture than behind of head to avoid possibility of breathe to lung. If people is insensible, prevent respiratory obstruction as turning the head. 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. Consider offering oxygen when people cannot breathe. Antidote(Copper) : kalium, Natrium, Edetate/Glucose , Vein Injection: Penicillamine, oral administration.

SECTION 5 Method for managing 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 When extingish the material which is related with this, use alcohol foam, carbon dioxide or water spray.(Ag)
Improper extinguish material	Direct water jet

When great fire is occurred	No data

2. Particular hamfulness from Chemical material

Pyrolysate	Iron oxide
Danger of Fire, Explosion	People can ignore danger of fire and explosion in common states. 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 forvid to enter isolating danger place. Use extinguish material which is adjusted by round the fire. Avoid to breathe material if self or product of combustion. Do not contact water directly to material.

SECTION 6 Method for managing leakage accident

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

2. Matters of management to protect evironment

Atmosphere	No data
Soil	Dispose of leaked material moving suitable container.
Under Water	Remove trapped material with absorption using exhaust hose. Do Adsorption treatment leaked material with activated carbon. 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. Notice emission content to government ministry or local government when the material is emited more than a standard amount. 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. Wash the body and clothes after using chemicals.
2. Safe storage method	Use and store following regulations and rules of government ministry or local government. Save storage location with a locking device. Avoid to contact with strong acid material.

SECTION 8 Exposure prevention and Personal protector

1. Exposure standard of chemicals, biological etc.

Exposure standard of chemicals (internal regulations)

Copper	Copper(Dust or Mist)TWA - 1㎎/㎥ Copper(Dust or Mist)STEL - 2㎎/㎥ Copper(Fume)TWA - 0.1㎎/㎥
Iron	TWA - 1㎎/㎥

Exposure standard of chemicals (Regulation of ACGIH)

Copper	TWA 0.2 ㎎/㎥, 1 ㎎/㎥ Copper(Fume), Copper(Dusts and mists, as Cu)
Iron	No Data

Exposure standard of biological　　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. Check work precess which is proper to standard of permission and Exposure standards of Ministry of Labor. 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 situtation, 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. 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 Physicochemical characteristics

1. Apperance		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	-
4. pH	No data	15. n-1-octanol/Coefficient division of water	-

5. Melting/Freezing point	1330 ℃	16. Spontaneous combustion temperature	No data
6. Early boiling point and range		17. Decomposition temperature	No data
7. Flashing point	No data	18. Vscosity	No data
8. Evaporating rate	No data	19. Molecular weight	-
9.flammability (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. Microscopic substances can be reacted with water. No polymerization.
2. Condition to avoid	Inhibit occuring of dust. 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

Exposure course	No data

나. Information of health hanfulness

Acute toxicity

Oral	LD50 984 mg/kg Rat(Iron)

Percutaneous	LD50 20000 mg/kg Guinea pig(Iron)
Breathe	No data
Skin corrosivity or Magnetic polarity	Test(Iron)
Severe eye damage or Magnetic polarity	No data
Respiratory organ hypersensitiveness	No data
Skin hypersensitiveness	No data

Carcinogenicity

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

SECTION 12 Environmental impact

1. Ecotoxicology

Fish	LC50 0.37 ㎎/ℓ 96 hr
	LC50 13.6 ㎎/ ℓ 96 hr
Crustacean	EC50 0.0318 ㎎/ℓ 48 hr
Birds	LC50 0.092 ㎎/ℓ 15 hr

2. Persistent and Resolvability

Persistent	log Kow -0.57 (Estimation)
	log Kow -0.77 (Estimation)
Resolvability	No data

3. Biological magnification

Magnification	BCF 5830(Copper)
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 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
Iron	3089

2. Proper Vessel name No data

3. Risk Rank of Transportation

Copper	4.1
Iron	4.3

4. Contaners grade

Copper	II
Iron	2

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
Iron	F-G

Emergency procedure in spill

Copper	S-G
Iron	S-G

SECTION 15 Regulation Terms and Status

1. Regulation of occupation safety and health acts

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

Iron	Control target material : Regulation of asterisk 7 about sanitation of industry Working environment measurement Material (Period measuring method : 6 month) : Occupation safety and health acts asterisk 11- 4
	Special health check material (Cycle diagnosis : 12month) : Occupation safety and health acts asterisk 12-2

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 Reference

1. Source of data
   1. National Environmental Research, the chemical information system: (NCIS)
   2. National Emergency Management(NEMA)
   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.wonilsa.co.kr). Please contact our Quality management team for other detailed issues.