Material Safety Data Sheet

[This sheet was made by Industrial Safety and Health Act, Article 41, in Korea]

Electrolytic Tin Plate(TP)

1. Chemical Product and Company Identification

A. Product Name : Electrolytic Tin Plate

B. Recommended Use of Product and restrictions on use

Recommended Use of Product : Cans, officesupplies, etc..

restrictions on use : None

C. Manufacturer / Supplier / Distributor Information

Name: KG Steel

Address : 1228, Bukbusaneom-ro, Songak-Eup, Dangjin-Si, Chungnam province, 343-823, Korea

Emergency phone number : +82-41-351-8527 / +82-41-351-8115

2. Hazards Identification

A. Hazard. Risk Classification : N/A

B. Label elements including precautionary statements

Symbol : N/A

Signal Word : N/A

Hazard-Risk Statement : N/A

Precautionary Statement

Prevention : N/A

Response : N/A

Storage : N/A

Disuse : N/A

C. Other Hazard. Risk which are not included in the classification criteria

TIn

Health : 1 Fire : N/A Reaction : N/A

Iron

Health : 2 Fire : N/A Reaction : N/A

3. Composition/Information on ingredients

Name	Other name	CAS No.	Percentage
Tin	Stannum	7440-31-5	Max 0.12%
Iron	Ferrium	7439-89-6	Max 98.6%

※ Please refer to the MSDS of iron

※ C, Si, Mn, Al and Ti may be added in minor amounts during manufacturing

※ This product is solid finished product. There is no possibility of exposure to chemicals contained in the product. It may be partially exposed in the melting state such as cutting, melting etc.

4. First aid measures

A. Eye contact

Get medical advice/attention

Rinse cautiously with water for several minutes

B. Skin contact

Rinse cautiously with water for several minutes

Remove contaminated clothing and shoes and isolate contaminated areas

Wash clothing and shoes thoroughly before reuse

Get medical advice/attention

C. Inhalation

Get medical advice/attention

Remove person to fresh air

If not breathing, give artificial respiration

If breathing is difficult, give oxygen

D. Ingestion

Do not feed anything to an unconscious person

Get medical advice/attention

E. Doctor's notes

Have the healthcare worker know about the material and take protective measures

Do not administer adrenaline.

5. Fire-Fighting measures

A. Suitable (and unsuitable) extinguishing media

Small fire: dry sand, dry chemical, alcohol-resistant foam, water spray, regular foam, CO2 (suitable extinguishing media)

Large fires: water spray / mist, regular foam (suitable extinguishing media)

High pressure water (improper extinguishing agent)

B. Specific hazards arising from the chemical

Can be ignited by heat, sparks and flames

Some can burn, but not easily ignite

May cause irritation and toxic gas in case of fire

Inhalation of the substance may be harmful

Some fluids may cause dizziness, vapors that may cause suffocation

C. Special protective equipment and precautions for fire-fighters

Tin

Escape the area and extinguish the fire at a safe distance

Move container from fir area if it is not hazardous

Iron

Move container from fir area if it is not hazardous

If it is impossible to extinguish the fire, protect the surroundings and let the fire extinguish itself

6. Accidental release measures

A. Personal precautions, protective equipment and emergency procedures

Remove all ignition sources

Stop the leak if it is not dangerous

Note the substances and conditions to avoid

Ventilate the contaminated area

Do not touch or walk with exposed material

Avoid dust formation

Do not enter if you do not need to enter or do not have protective equipment

B. Environmental precautions and protective procedures

Prevent entry into waterways and sewers.

C. Methods and materials for containment and cleaning up

In case of powder leakage, cover with plastic sheet to prevent spread and keep dry

7. Handling and storage

A. Precautions for safe handling

Note the substances and conditons to avoid

Wash thoroughly after handling

Refer to engineering controls and personal protective equipmenet

Be careful of high temperatiures

B. Conditions for safe storage

Keep tightly closed

Store in a cool, dry place

Note the substances and conditions to avoid

8. Exposure controls & personal protection

A. Control parameters

Domestic regulations

TIn: TWA : 2 ㎎/㎥ Tin(Metal)

TWA : 0.1 ㎎/㎥ Tin(Organic compound)

Iron : TWA 1mg/m³`

ACGIH

TIn: TWA 2 mg/m³ Tin (Metal)

TWA 2 mg/m³ Tin (Metal)

TWA 0.1 mg/m³ Tin (Organic compound)

Iron : N/A

Biological exposure standard : N/A

B. Appropriate engineering controls

Use process isolation, local exhaust, or keep air level below exposure standard

C. Personal protective equipment

Respiratory protection

Tin (Metal)

Wear respiratory protection which has been approved by the Korean Occupational Safety and Health Administration in accordance with physicochemical properties of the particulate matter to be exposed.

If the exposure level is lower than 20mg/m³, wear a respiratory protective gear of half mask type that have appropriate type filter.

If the exposure concentration is lower than 50mg/m³, wear a dust mask of loose-fitting hood /powered helmet type or continuous-flow type that have appropriate type filter.

If the exposure concentration is lower than 100mg/m³, wear a respiratory protective gear of full type or powered and half type or Air-fed continuous-flow / pressure-demanding type that have appropriate type filter.

If the exposure concentration is lower than 2000mg/m³, wear a ventilation mask of full type or hood/helmet type or Pressure-demanded type that have appropriate type filter.

If the exposure concentration is lower than 20000mg/m³, wear self-contained breathing apparatus (SCBA) or self-contained breathing apparatus with pressure-demand self-contained breathing apparatus (SCBA) with appropriate filter.

Tin (Organic compound)

Wear respiratory protection which has been approved by the Korean Occupational Safety and Health Administration in accordance with physicochemical properties of the particulate matter to be exposed.

If the exposure level is lower than 1mg/m³, wear a respiratory protective gear of half mask type that have appropriate type filter.

If the exposure concentration is lower than 2.5mg/m³, wear a dust mask of loose-fitting hood /powered helmet type or continuous-flow type that have appropriate type filter.

If the exposure concentration is lower than 5mg/m³, wear a respiratory protective gear of full type or powered and half type or Air-fed continuous-flow / pressure-

demanding type that have appropriate type filter.

If the exposure concentration is lower than 100mg/m³, wear a ventilation mask of full type or hood/helmet type or Pressure-demanded type that have appropriate type filter.

If the exposure concentration is lower than 1000mg/m³, wear self-contained breathing apparatus (SCBA) or self-contained breathing apparatus with pressure-demand self-contained breathing apparatus (SCBA) with appropriate filter.

Iron

Wear respiratory protection which has been approved by the Korean Occupational Safety and Health Administration in accordance with physicochemical properties of the particulate matter to be exposed.

If the exposure level is lower than 10mg/m³, wear a respiratory protective gear of half mask type that have appropriate type filter.

If the exposure concentration is lower than 25mg/m³, wear a dust mask of loose-fitting hood /powered helmet type or continuous-flow type that have appropriate type filter.

If the exposure concentration is lower than 50mg/m³, wear a respiratory protective gear of full type or powered and half type or Air-fed continuous-flow / pressure-demanding type that have appropriate type filter.

If the exposure concentration is lower than 1000mg/m³, wear a ventilation mask of full type or hood/helmet type or Pressure-demanded type that have appropriate type filter.

If the exposure concentration is lower than 10000mg/m³, wear self-contained breathing apparatus (SCBA) or self-contained breathing apparatus with pressure-demand self-contained breathing apparatus (SCBA) with appropriate filter.

Eye protection

Use chemical protective eyewear and protective face

Install eyewash station and emergency shower near work area

Hand protection

Wear suitable chemical resistant gloves

Body protection

Wear suitable chemical resistant clothing

9. Physical and chemical properties

TIn

A. Appearance

Appearance : Solid(Powder)

Colour : Gray (Polish)

B. Odour : Odorless

C. Odour threshold : N/A

D. pH : N/A

E. Meting point/freezing point : 231.9 ℃

F. Initial boiling point and boiling range : 2,260 ℃

G. Flash point : N/A

H. Evaporation rate : N/A

I. Flammability(solid, gas) : Flammability (exposure to heat in the form of dust or spontaneous ignition of chemicals)

J. Upper/lower flammability or explosive limits : N/A

K. Vapour pressure : 1mmHg(at 1787 ℃)

L. Solubility : (Insolubility)

M. Vapor density : N/A

N. Specific gravity : 7.2

O. N-octanol/water Partition coefficient : N/A

P. Auto-ignition temperature : N/A

Q. Decomposition temperature : N/A

R. Viscosity : 1.85 (240 ℃)

S. Molecular weight : 118.71

Iron

A. Appearance

Appearance : Solid

Colour : White or Gray

B. Odour : N/A

C. Odour threshold : N/A

D. pH : N/A

E. Meting point/freezing point : 1535℃

F. Initial boiling point and boiling range: 2750℃

G. Flash point : None

H. Evaporation rate : None

I. Flammability(solid, gas) : None

J. Upper/lower flammability or explosive limits : None

K. Vapour pressure : 1 mmHg (at 1787℃)

L. Solubility : (Water solubility: Insolubility. Solvent availability : availability : acid.
Insolubility : alkali, Alcohol, ether)

M. Vapor density : None

N. Specific gravity : 7.86 ((water=1))

O. N-octanol/water Partition coefficient : None

P. Auto-ignition temperature : None

Q. Decomposition temperature : None

R. Viscosity : None

S. Molecular weight : 55.85

10. Stability and reactivity

A. Chemical stability and possibility of hazardous reactions

TIn

Some can burn, but not easily ignite

Non-flammable materials are not burned but, decompose on heating and may cause corrosive toxic fumes.

Iron

Can be ignited by friction, heat, spark, flame

May re-ignite after extinguish the fire

Some materials burn with intense heat

Dust and fumes can form explosive mixtures with air

May cause irritating, corrosive and toxic gases in case of fire

Inhalation and contact with vapors, substances, and decomposition products may result in serious injury or death

Oxides in metal fires have serious health hazards

B. Conditions to avoid

Tin : Heat, spark, flame, etc

Iron : Heat, spark, flame, etc

C. Incompatible materials

Tin : Conbustible material, reducing material

Iron : Water

D. Hazardous decomposition products

Tin : Corrosive/Toxic fume

Irritant, corrosive, toxic gas

Iron : Irritant, corrosive, toxic gas

11. Toxicological information

A. Information on the likely routes of exposure : N/A

Tin : N/A

Body can be absorbed by inhalation.

Can be absorbed by suction and digestice organ

Body can be absorbed by inhalation of vapor.

Can be absorbed by inhalation, skin and digestive system.

Iron : N/A

Body can be absorbed by inhalation.

Can be absorbed by suction and digestice organ

Body can be absorbed by inhalation of vapor.

Can be absorbed by inhalation, skin and digestive system.

B. Health hazards information

Acute toxic

Oral

Tin : LD50 > 2000 mg/kg Rat (OECD TG 423, GLP)

Iron : LD50 98600 mg/kg Rat (OECD TG 401 Male)

Dermal

Tin : LD50 > 2000 mg/kg Rat (OECD TG 402, GLP)

Iron : LC50 20000 mg/kg Guinea pig

Inhalation

Tin : Dust LC50 > 4.75 mg/ℓ 4 hr Rat (OECD TG 403, GLP)

Iron : Dust LC50 > 100mg/m³ 6 hr Rat (Not applicable to classification due to lack of reliability of data such as mouse, hamster and guinea pig)

Skin corrosive/irritant

Tin : As a result of skin corrosion / irritation test on rabbit, no irritation beacuse the irritation index is zero OECD TG 404, GLP

Iron : As a result of skin corrosion / irritation test on rabbits, no corrosivity OECD TG 404

Serious eye damage/eye irritation

Tin : As a result of eye damage / irritation test using rabbit, no irritation due to no significant irritation effect OECD TG 405, GLP

Iron : As a result of eye damage / irritation test on rabbots, no stimulation OECD TG 405

Respiratory sensitization : N/A

Skin sensitization

Tin : As a result of reviewing data from humans, guinea pigs, rats and mice, no skin sensitization.

Iron : As a result of the skin sensitization test for guinea pigs, all iron oxide materials are non-irritant

Similar materials : 1309-37-1, 1317-61-9, 1310-14-1

Carcinogenicity

Industrial Safety and Health Act : N/A

Ministry of Labor examination : N/A

IARC : N/A

OSHA : N/A

ACGIH

TIn: A4 (Tin and organic compounds, as Sn)

Iron : N/A

NTP : N/A

EU CLP : N/A

Germ cell Mutagenicity

Tin : As a result of gene mutation test using in vitro cultured mammalian cells, It is negative regardless of metabolic activation system OECD TG 476, GLP

As a result of the chromosome aberration test using the cultured cells of the mammalian cells in vitro, It is negative regardless of metabolic activation system.OECD TG 471, GLP

As a result of the mutation test using the in vitro microorganism, It is negative regardless of metabolic activation system.OECD TG 473, GLP

Iron : As a result of gene mutation test using in vitro cultured mammalian cels, carbonyl iron is positive and electrolytic iron is negative OECD TG 476

Germ cell toxicity

Tin : As a result of the oral reproductive toxicity test using the rats, NOEL > 1,000 mg/kg/day (OECD TG 421)

Iron : N/A

Specific target organ toxicity(Single exposure)

Tin : Because pneumoconiosis occurred in workers handling metal tin, they were classified as Category 1 according to EHC15 data

Causes respiratory irritation

Iron : N/A

Specific target organ toxicity(Repeated exposure)

Tin : Lung damage is seen in workers handling tin metal

As a result of 28 days oral toxicity test using rats, No effect observed at maximum concentrationNOEL > 1,000 mg/kg bw/day OECD TG 407, GLP

Iron : As a result of oral target organ systemic toxicity test on rats, the liver are affected

As a result of inhalation target organ systemic toxicity test or rats, NOAEC = 5mg/m³

Aspiration hazard : N/A

Other harmful effects : N/A

12. Ministry of Labor examination

A. Ecotoxicity

Fish

Tin : LC50 > 0.0124 mg/ℓ 96 hr Pimephales promelas (OECD Guideline 203, GLP)

Iron : LC50 13.6mg/ℓ 96 hr (Danio rerio, LC0, 96h, >100,000mg/L,

Similar materials :51274-00- 1, OECD Guideline 203,

Brachydanio rerio, LL0, LC50, 96h, > 10,000mg/L,

Similar materials : 1317-61-9

Crustacea

Tin : N/A

Iron : EC50 > 100mg/ℓ 48hr Daphnia magna

(Similar materials CAS No. 1309-37-1 OECD TG 202)

Algae

Tin : EC50 > 0.0192 mg/ℓ 72 hr Others (Pseudokirchnerella subcapitata, OECD TG 201, GLP, No significant effects were observed with poorly soluble materials.)

Iron : N/A

B. Persistence and degradability

Persistence : N/A

Degradability : N/A

C. Bioaccumulative potential

Accumulation : N/A

Biodegradable : N/A

D. Mobility in soil : N/A

E. Other adverse effects

Tin : Crustacea Ceriodaphnia dubia : LOEC = 200μg/L 7d EPA 1002.0

Iron : N/A

13. Disposal considerations

A. Disposal method

Tin : N/A

Iron : Use one of the following methods.

1. Solidify
2. Land a designated waste in a managed landfill
3. Incinerate spent catalysts containing flammable materials
4. In case of incinerating waste catalyst containing halogenated material, incinerate at high temperature

B. Disposal precaution

Tin : Dispose of contents container according to applicable regulations

Iron : If specified in the Waste Management Act, consider the precautions specified in the regulations

14. Transport information

A. UN Number (UN No.)

Tin : N/A

Iron : 3089

B. UN proper shipping name

Tin : N/A

Iron : Metal powder(Flammable)(Except that the name of the product is not specified)
METAL POWDER, FLAMMABLE, N.O.S.

C. Transport hazard

Tin : N/A

Iron : 4.1

D. Packing group

Tin : N/A

Iron : Ⅱ

E. Environmental hazards

Tin : N/A

Iron : Not applicable

F. Special safety measures that the user needs or needs to know about transport or means of transport.

Emergency measures in case of fire

Tin : N/A

Iron : F-G

Emergency measures in case of leak

Tin : N/A

Iron : S-G

15. Regulatory information

A. Industrial Safety and Health Act

Tin : Toxic substances to be controlled

Working environment Measured material (measurement cycle: 6 months)

Special medical examination subject substance (diagnosis period: 12 months)

Exposure standard setting substance

Iron : Toxic substances to be controlled

Exposure standard setting substance

B. Toxic Chemical Control Act : N/A

C. Dangerous Material Safety Control Act

Tin : Class 2 metal powder 500kg

Iron : Class 2 Iron powder 500kg

D. Wastes Management Act

Tin : N/A

Iron : Designated waste

E. Other requirements in domestic and other countries

Domestic regulation

Residual Organic Pollutant Control Act : N/A

Foreign regulation

US Administration Information(OSHA Rule : N/A

US Administration Information(CERCLA Rule)

US Administration Information (EPCRA 302 Rule) : N/A

US Administration Information (EPCRA 304 Rule) : N/A

US Administration Information (EPCRA 313 Rule)

US Administration Information (Rotterdam Convention material) : N/A

US Administration Information (Stockholm Convention substance) : N/A

US Administration Information (Montreal Protocol substance) : N/A

EU Classification information (Confirmed classification result) : N/A

EU Classification information (Risk phrases) : N/A

EU Classification information (Safety phrases) : N/A

16. Other information

A. Source of material

Tin

HSDB (Appearance)

HSDB (B. Colour)

ICSC (E. Melting point/Freezing point)

ICSC (F. Initial boiling point and boiling range)

HSDB (L. Solubility)

ICSC (N. Specific gravity)

HSDB (R. Viscosity)

pubchem(S. Molecular weight)

ECHA (Oral)

ECHA (Dermal)

ECHA (nhalation)

ECHA (Skin corrosive/irritant)

ECHA (Serious eye damage/eye irritation)

ECHA (Skin sensitization)

ECHA (Germ cell Mutagenicity)

ECHA (Germ cell toxicity)

NITE, IPCS (Specific target organ toxicity(Single exposure))

ECHA (Specific target organ toxicity(Repeated exposure))

ECHA (Fish)

ECHA (Algae)

ECHA (E. Other adverse effects)

Iron

HSDB (Appearance)

HSDB (Colour)

HSDB (E. Melting point/Freezing point)

HSDB (F. Initial boiling point and boiling range)

HSDB (K. Vapour pressure)

ICSC (L. Solubility)

ICSC (N. Specific gravity)

pubchem (S. Molecular weight)

ECHA (Oral)

ECHA (Dermal)

ECHA (Skin corrosion or irritation)

ECHA (Serious eye damage or irritation)

ECHA (Skin sensitization)

ECHA (Germ cell mutagenicity)

(Reproductive toxicity)

NITE, CICAD (Specific target organ toxicity (Repeated exposure))

ECHA (Fish)

ECHA (Crustacean)

ECHA (D. Mobility in soil)

B. Issuing date : 2004.12

C. Revision number : 4 Times

D. Revision number : 2020.04.03

E. Others

This information is based on the industrial Safety and Health Act and the knowledge and related materials to date. However, the risk of hazardous substances is not written to all the risks of hazardous substances exist there may be unknown hazards of all chemicals in this material may be prescribed. Therefore, our customers and potential customers should review this information and precaution, look precautions carefully and verify suitability about applicable laws and regulations related to the use and disposal of this product.

This information is intended solely for the purpose of describing the health, safety and environmental requirements of the product handler and should not be construed as an endorsement of the characteristics or quality of the product.

Please understand that it is the sole responsibility of the user to evaluate the final suitability of the product, as it is impossible to control the actual application of this product. It is necessary to establish appropriate safety measures in accordance with the application and usage in case of special handling.

This document can be revised based on the new information.