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# Material Safety Data Sheet

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

## Chrome Plated Steel Sheet (TFS)



## 1. Chemical Product and Company Identification

A. Product Name : Chrome Plated Steel Sheet

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

Respiratory sensitization : Classification 1

Skin sensitization : Classification 1

B. Label elements including precautionary statements

Symbol



Signal Word : Hazards

Hazard-Risk Statement

H317 May cause an allergic skin reaction

H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled

Precautionary Statement

Prevention

P261 Avoid breathing dust/dume/gas/mist/vapours/spray

P272 Contaminated work clothing should not be allowed out of the workplace

P280 Wear protective gloves/protective clothing/eye protection/face protection/...

Prevention

P284 In case of inadequate ventilation, wear respiratory protection

P304+P340 If Inhaled, remove person to fresh air  
and keep comfortable for breathing.

Response

P333+P313 If skin irritation or rash occurs, Get medical advice/attention

P342+P311 If experiencing respiratory symptoms, call a poison center/doctor/...

P362+P364 Take off contaminated clothing and wash it before reuse

Storage : N/A

Disuse

P501 Dispose of contents/container according to applicable regulations

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

Chrome

Health : 0    Fire : N/A    Reaction : 0

Iron

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

### 3. Composition/Information on ingredients

Name	Other name	CAS No.	Percentage
Chrome	Chromium	7440-47-3	Max 0.1%
Iron	Ferrium	7439-89-6	Max 98.7%

※ 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

In the case of hot materials, immerse or rinse affected areas in a large amount of cold water to remove heat.

Get medical advice/attention

Remove contaminated clothing and shoes and isolate contaminated areas

Rinse cautiously with water for several minutes

Prevent contamination from spreading.

If skin irritation or rash occurs, get medical advice / advice.

Wash clothing and shoes thoroughly before reuse

##### C. Inhalation

If inhaled and difficulty breathing, remove to fresh air and keep at rest in a position comfortable for breathing.

If respiratory symptoms occur, get medical advice.

Remove person to fresh air

If not breathing, give artificial respiration

If breathing is difficult, give oxygen

make it warm and stable.

##### D. Ingestion

Get medical advice/attention

##### E. Doctor's notes

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

## 5. Fire-Fighting measures

### A. Suitable (and unsuitable) extinguishing media

Use alcohol foam, carbon dioxide or water spray

Use dry sand or soil for extinguishment by smothering

### B. Specific hazards arising from the chemical

Some can burn, but not easily ignite

Non-flammable materials do not burn, but can generate corrosive/toxic fumes

May cause irritation and toxic gas in case of fire

### C. Special protective equipment and precautions for fire-fighters

#### Chrome

Rescuers should wear appropriate protective equipment

Escape the area and extinguish the fire at a safe distance

Move container from fire area if it is not hazardous

#### Iron

Move container from fire 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

Do not touch or walk with exposed material

Cover with plastic sheet to prevent spreading

Note the substances and conditions to avoid

### B. Environmental precautions and protective procedures

Prevent entry into waterways and sewers.

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

Collect the spills

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

## 7. Handling and storage

### A. Precautions for safe handling

Do not remove contaminated clothing from the work area

Use only in well-ventilated areas

Avoid prolonged or repeated skin contact

Note the substances and conditions to avoid

Refer to engineering controls and personal protective equipment

### B. Conditions for safe storage

Keep away from heat, sparks, flames and high temperature

## 8. Exposure controls & personal protection

### A. Control parameters

Domestic regulations

Chrome

TWA – 0.5mg/m<sup>3</sup> Chrome (II) compounds

TWA – 0.5mg/m<sup>3</sup> Chrome (III) compounds

TWA – 0.5mg/m<sup>3</sup> Chrome (Metal)

Iron

TWA - 1mg/m<sup>3</sup>

ACGIH

Chrome

TWA 0.5mg/m<sup>3</sup> Chrome (II) compounds

TWA 0.5mg/m<sup>3</sup> Chrome (III) compounds

TWA 0.5mg/m<sup>3</sup> Chrome (Metal)

TWA 0.003mg/m<sup>3</sup> Chrome (Powder)

Iron : N/A

Biological exposure standard : N/A

### B. Appropriate engineering controls

If dust, fumes or mist is generated during operation, ventilate to keep airborne contamination below the exposure limit.

## C. Personal protective equipment

### Respiratory protection

#### Chrome (II) compounds

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  $5\text{mg}/\text{m}^3$ , wear a respiratory protective gear of half mask type that have appropriate type filter.

If the exposure concentration is lower than  $12.5\text{mg}/\text{m}^3$ , 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  $25\text{mg}/\text{m}^3$ , 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  $500\text{mg}/\text{m}^3$ , 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  $5000\text{mg}/\text{m}^3$ , wear self-contained breathing apparatus (SCBA) or self-contained breathing apparatus with pressure-demand self-contained breathing apparatus (SCBA) with appropriate filter.

#### Chrome(III)compounds

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  $5\text{mg}/\text{m}^3$ , wear a respiratory protective gear of half mask type that have appropriate type filter.

If the exposure concentration is lower than  $12.5\text{mg}/\text{m}^3$ , 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  $25\text{mg}/\text{m}^3$ , 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  $500\text{mg}/\text{m}^3$ , 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  $5000\text{mg}/\text{m}^3$ , wear self-contained breathing apparatus (SCBA) or self-contained breathing apparatus with pressure-demand self-contained breathing apparatus (SCBA) with appropriate filter.

#### Chrome(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  $5\text{mg}/\text{m}^3$ , wear a respiratory protective gear of half mask type that have appropriate type filter.

If the exposure concentration is lower than  $12.5\text{mg}/\text{m}^3$ , 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  $25\text{mg}/\text{m}^3$ , 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  $500\text{mg}/\text{m}^3$ , 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  $5000\text{mg}/\text{m}^3$ , 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  $10\text{mg}/\text{m}^3$ , wear a respiratory protective gear of half mask type that have appropriate type filter.



If the exposure concentration is lower than  $25\text{mg}/\text{m}^3$ , 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  $50\text{mg}/\text{m}^3$ , 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  $1000\text{mg}/\text{m}^3$ , 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  $10000\text{mg}/\text{m}^3$ , wear self-contained breathing apparatus (SCBA) or self-contained breathing apparatus with pressure-demand self-contained breathing apparatus (SCBA) with appropriate filter.

## 9. Physical and chemical properties

Chrome

A. Appearance

Appearance : Solid(Powder)

Colour : Gray

B. Odour : Odorless

C. Odour threshold : N/A

D. pH : N/A

E. Melting point/freezing point :  $1900^\circ\text{C}$

F. Initial boiling point and boiling range :  $2642^\circ\text{C}$

G. Flash point : N/A

H. Evaporation rate : N/A

I. Flammability(solid, gas) : N/A

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

K. Vapour pressure : 1mmHg (at  $1616^\circ\text{C}$ )

L. Solubility : (Insoluble(water))

M. Vapor density : N/A

- N. Specific gravity : 7.14
- O. N-octanol/water Partition coefficient: 0.23
- P. Auto-ignition temperature : N/A
- Q. Decomposition temperature : N/A
- R. Viscosity : N/A
- S. Molecular weight : 51.996

## Iron

- A. Appearance
  - Appearance : Solid
  - Colour : White or Gray
- B. Odour : N/A
- C. Odour threshold : N/A
- D. pH : N/A
- E. Melting point/freezing point : 1535°C
- F. Initial boiling point and boiling range: 2750°C
- 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°C)
- 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

#### Chrome

Can decompose at high temperature and generate toxic gas

Some can burn, but not easily ignite

Non-flammable materials do not burn, but can generate corrosive/toxic fumes by decomposing at high temperatures

#### Iron

Can be ignited by heat, sparks and flames

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

#### Chrome

Heat, Spark, Flame etc Ignition source

#### Iron

Heat, Spark, Flame

### C. Incompatible materials

#### Chrome

Combustible material, Reducing material

#### Iron

Water

### D. Hazardous decomposition products

#### Chrome

Corrosive/toxic fume

#### Iron

Irritant, corrosive, toxic gas

## 11. Toxicological information

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

B. Health hazards information

Acute toxic

Oral

Chrome: LC50 > 5000 mg/kg Rat (Similar materials : No data OECD TG 420, GLP)

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

Dermal

Chrome : N/A

Iron : LD50 20000 mg/kg Guinea pig

Inhalation

Chrome : Dust LC50 > 5.41mg/l 4 hr Rat

(Similar materials : 1308-38-9, OECD TG 403, GLP)

Iron : Dust LC50 > 100mg/m<sup>3</sup> 6 hr Rat (Not applicable to classification due to lack of reliability of data such as mouse, hamster and guinea pig)

Skin corrosive/irritant

Chrome: As a result of skin corrosion / irritation test on rabbit, no stimulation

Similar materials : ChromiumIIIoxide, OECD TG 404, GLP

Iron : As a result of skin corrosion / irritation test on rabbits, no stimulation

OECD TG 404

Serious eye damage/eye irritation

Chrome : The eye damage / irritation test on rabbits resulted in a slight flushing in 2 animals after 1 hour, but there was no irritation after 24 hours.

Similar materials : ChromiumIII oxide, OECD TG 405, GLP

Iron : As a result of eye damage / irritation test on rabbits, no stimulation

OECD TG 405

Respiratory sensitization

Chrome : Classified as a respiratory sensitizer

Iron : N/A

## Skin sensitization

Chrome : Metal chromium, chromium alloy, chrome plating is likely to cause skin sensitization if it is melted by moisture and exposed to chromium ions.

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, 1310-1401

## Carcinogenicity

Industrial Safety and Health Act : N/A

Ministry of Labor examination : N/A

## IARC

Chrome : Group 3

Iron : N/A

OSHA : N/A

## ACGIH

Chrome: A4

Iron: N/A

NTP : N/A

EU CLP : N/A

## Germ cell Mutagenicity

Chrome : As a result of chromosome aberration test in rats, positivity

As a result of the in vitro genomic mutation test, negative in the absence of metabolic activation system, EU Method B.21

As a result of micronucleus test using in vivo mammalian mouse erythrocytes, negative

Similar materials : chromium(III) oxide, chromium chloride, OECD TG 474, GLP

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

## Germ cell toxicity

Chrome : As a result of reproductive toxicity test on rats, no maleformative toxicity observed (Similar materials : chromium(III) oxide)

Iron : N/A

Specific target organ toxicity(Single exposure)

Chrome : Possible to cause metal fume heat. Prayer stimulation in man

Iron : N/A

Specific target organ toxicity(Repeated exposure)

Chrome : Results of Oral Target Organ Systemic Toxicity Studies on rats

NOAEL = 1,368mg/kg bw/day수컷, 1,216mg/kg bw/day

As a result of the inhalation target organ systemic toxicity test in rats, mild inflammation reaction was observed, and inflammation frequency of the lung was intense  
LOAEC = 4.4 mg/m<sup>3</sup>

Similar materials : chromiumIII oxide OECD TG 413

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/m<sup>3</sup>

Aspiration hazard : N/A

Other harmful effects : N/A

## 12. Ministry of Labor examination

### A. Ecotoxicity

Fish

Chrome : N/A

Iron : LC50 13.6 mg/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 : EC50 > 100mg/l 48 hr Daphnia magna

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

Algae : N/A

B. Persistence and degradability

Persistence

Chrome: log Kow 0.23

Iron : N/A

Degradability : N/A

C. Bioaccumulative potential

Accumulation : N/A

Biodegradable : N/A

D. Mobility in soil : N/A

E. Other adverse effects : N/A

### 13. Disposal considerations

A. Disposal method

Chrome : 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

Dispose of contents container according to applicable regulations

### 14. Transport information

A. UN Number (UN No.)

Chrome : N/A

Iron : 3089

B. UN proper shipping name

Chrome: 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

Chrome : N/A

Iron : 4.1

D. Packing group

Chrome : N/A

Iron : II

E. Environmental hazards

Chrome : 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

Chrome : N/A

Iron : F-G

Emergency measures in case of leak

Chrome : N/A

Iron : S-G

## 15. Regulatory information

A. Industrial Safety and Health Act

Chrome: 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

Chrome: Class 2 metal powder 500kg

Iron : Class 2 Iron powder 500kg

D. Wastes Management Act

Chrome: 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)

Chrome: 2267.995kg 5000lb

Iron : N/A

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

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

US Administration Information (EPCRA 313 Rule)

Chrome : Applicable

Iron : N/A

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

Chrome

ICSC (Appearance)

ICSC (Colour)  
HSDB (B. Odour)  
ICSC (E. Melting point/freezing point)  
ICSC (F. Initial boiling point and boiling range)  
HSDB (K. Vapour pressure)  
HSDB (L. Solubility)  
HSDB (N. Specific gravity)  
SRC (O. N-octanol/water Partition coefficient )  
pubchem(S. Molecular weight )  
ECHA (Oral)  
ECHA (Inhalation)  
ECHA (Skin corrosive/irritant )  
ECHA (Serious eye damage/eye irritation)  
NITE (Respiratory sensitization)  
NITE (Skin sensitization)  
ECHA (Germ cell Mutagenicity)  
ECHA (Germ cell toxicity)  
ECHA (Specific target organ toxicity(Single exposure))  
ECHA (Specific target organ toxicity(Repeated exposure))  
Chemsrsc(Persistent)

## 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.