

Material Safety Data Sheet

[This material was composed according to the Article No.41 of occupation safety and health acts.]

Product name	ALCOSTA
---------------------	----------------

1. Identification

A. Product name	ALCOSTA
B. Recommended use and restriction on use	
Recommended use of product	Manufacturing steel
Limit on using product	Do not use except for purpose
C. Supplier information	
Company name	POSCO Coated & Color Steel Co.
Address	173 Chulgangro, Namgu, Pohangsi, Gyungso
Emergency numbers	82-54-280-6114

2. Hazard identification

A. GHS Classification	Flammable solid : Classification 2 Pyrophoric solid : Classification 1 Chronic aquatic environment hazard : Classification 1
B. GHS label elements	
Hazard symbols	
Signal words	Danger
Hazard statements	H228 Flammable solid H250 Self ignited when exposed to air H410 Very toxic to aquatic organisms due to long term effects.
Precautionary statement	
Prevention	P210 Keep away from heat · spark · flame · high heat-No smoking. P240 Ground/bond container and receiving equipment P241 Use explosion-proof electrical/ventilation/lighting/equipment P273 Do not discharge into the environment. P280 Wear protective gloves/protective clothing/eye protection/face protection. P335+P334 Shake off any substance on the skin, soak in cold water or wrap it with a wet bandage. P370+P378 Use a fire extinguisher to ignite the fire.
Response	P391 Collect spills. P422 Keep at appropriate distance. P501 Dispose of contents/container in accordance with local/regional/national/international regulation
Storage	
Disposal	
C. Other hazards which do not result in classification :(NFPA Classification)	No data

3. Composition/Information on ingredients

Chemical name	Trade names and Synonyms	CAS No.	Content (%)
Aluminium		7429-90-5	9.68 Max
Silicon		7440-21-3	0.85 Max
Steel	FERRIUM	7439-89-6	More than 89.47

※ Small quantity of other ingredients can be included(Copper, Nickel, Chrome, Titanium, Zinc, Magnesium, Manganese etc.)

※ For general chrome processing products, that according to the production of including Cr6 ingredients as follows.

※ This product is a solidified finished product. In case of products which are not exposed to the chemicals contained in the products, cutting or fusing, some parts of it can be exposed.

4. First aid measures

A. Eye contact	Wash eyes carefully for a few minutes with water. If possible, get rid of contact lens. Keep washing. Take medical treatment or advice if eyes are irritated.
B. Skin contact	Take medical treatment or advices if skins are irritated Put off contaminated clothing. In case of hot materials, wash or soak the damaged parts in the cold water to remove the heat. Remove contaminated clothing, shoes and isolate. If contact with the material wash the skin and eyes immediately flowing water for 20 minutes or more. When slightly in contact with the skin, please avoid contamination spreading region. When reomving the molten material is adhered to the skin, get medical help. If you feel uncomfortable, please seek medical attention/advice.
C. Inhalation contact	Move to the place where fresh air is. Please be warm and stable.
D. Ingestion contact	If you feel uncomfortable swallowed, call a poison center or physician. Wash the mouth If you eat or inhale the substance, rather than by mouth to mouth artificial respiration, please use appropriate respirate medical equipment.
E. Other precautions	Take protective measures and let medical personnel recognize the relevant materials.

5. Firefighting measures

A. Suitable(unsuitable) extinguishing media	To use alcohol bubble, CO2 or water spray when extinguishing this material. To use dried sand or soil when extinguishing by smothering.
B. Specific hazards arising from the chemical	Very toxic and harmful gas can occur due to thermal decomposition or combustion. Containers may explode when heated. Some can be burned but are not easily lightened.
C.Special protective actions for firefighters	Nonflammable materials are not burned but corrosive/fume can occur by decomposing when heated Rescuer shall wear suitable protective equipment. Extinguish fire keeping the safe distance. Move the material out of fire hazard area if it is not dangerous. If it is impossible to extinguish, protect surrounding area and make it to be self-extinguished

6. Accidental release measures

A. Personal precautions, protective equipment and emergency procedures	Do not breathe(dust/fumes/gas/mist/vapor/spray) Please isolate the contaminated area. Do not allowed, people who do not meet the needs or fit protective equipment. Remove all source of ignition. Without wearing suitable protective clothing, Do not touch damaged containers or spillage. For preventing the spread of a plastic cover sheet. Be careful about the materials or conditions to be avoided.
B. Environmental precautions	Prevent inflow to channel, drain and enclosed space.

C. Methods and materials for containment and cleaning up

Absorb the spill with an inert material (ex. Dry sand or soil) and Put a chemical waste container.
Put in a waste container.

7. Handling and storage

A. Precautions for safe handling

Do not use until you read and understand all of safety measurements
After using it, wash thoroughly the used area.
Do not use, drink or smoke when using this product.
Avoid the long-term/constant contact to the skin
Be careful when using/storing the product.
Be careful about the materials and conditions to be avoided.

B. Conitions for safe storage, including any incompatibilities

Keep away from food and drink.
Store it in a dry place.
Keep the distance between shipment.

8. Exposure controls/personal protection

A. Leakage threshold of chemical materials and biological leakage threshold etc.

ACGIH standards

Al

(Aluminum metal) TWA 10mg/m3

Si

TWA-10mg/m3

Fe

TWA-1mg/m3

B. Engineering Controls

Keep this material, or equipment that is used below to install the safety shower and washing equipment.

C. Personal protective equipment

Protect respiratory organ

Wear protective equipment for respiratory organ, which are licensed
by Korea Occupational Safety & Health Agency in terms of chemicoophysical properties

Protect eyes

Wear protective glass to protect eyes from dust and particles etc.

Protect hands

Wear protective gloves suitable for work.

Protect human body

Wear protective clothes suitable for work.

9. Physical and chemical properties

A. Appearance

Form

Solid

Color

Metal gray

B. Ordor

Ordorless

C. Ordorthreshold concentration

No data

D. pH

No data

E. Melting point/Freezing point

No data

F. Early boiling point and range of boiling point

No data

G. Flash point

No data

H. Evaporation speed

No data

I. Combustible(Solid, Gas)

No data

J. Flammable or maximum/minimum of explosion range

No data

K. Steam pressure

No data

L. Solubility

No data

M. Steam density

No data

N. Gravity

No data

O. n-Octanol/Water distribution coefficient

No data

P. Self-ignition temperature

No data

Q. Decomposition temperature

No data

R. Viscosity

No data

S. Molecular weight

No data

Al

A. Appearance

Form

Solid (Powder)

Color

Silvery~Grey

B. Ordor

Odorless

C. Threshold concentration of Ordor

No data

D. pH

No data

E. Melting point/Freezing point

660℃

F. Early boiling point and range of boiling point

2327℃

G. Flash point

No data

H. Evaporation speed

No data

I. Combustible(Solid, Gas)

No data

J. Flammable or maximum/minimum of explosion range

-/-

K. Steam pressure

1mmHg(1284℃)

L. Solubility

(Insoluble)

M. Steam density

No data

N. Gravity

2.7

O. n-Octanol/Water distribution coefficient

No data

P. Self-ignition temperature

590℃

Q. Decomposition temperature

No data

R. Viscosity

No data

S. Molecular weight

26.98

Si

A. Appearance

Form

Solid (external appearance : Glossy)

Color

Brown, Black, Grey

B. Ordor

Odorless

C. Threshold concentration of Ordor

No data

D. pH

(Not applicable)

E. Melting point/Freezing point

1410℃

F. Early boiling point and range of boiling point

2355℃

G. Flash point

33~44℃

H. Evaporation speed

No data

I. Combustible(Solid, Gas)

Flammable solid

J. Flammable or maximum/minimum of explosion range

-/-

K. Steam pressure

1mmHg (at 1724℃)

L. Solubility

(Water solubility : Insolubility. Solvent soluble A: Melted Alkali oxide)

M. Steam density

No data

N. Gravity

2.33 (Water=1)

O. n-Octanol/Water distribution coefficient

(None)

P. Self-ignition temperature

>=25 - <=66℃ (>=100 - <=105kPa)

Q. Decomposition temperature

No data

R. Viscosity

No data

S. Molecular weight

28.09

Fe	
A. Appearance	
Form	Solid
Color	White or grey
B. Odor	None
C. Ordorthreshold concentration	No data
D. pH	(Not applicable)
E. Melting point/Freezing point	1535°C
F. Early boiling point and range of boiling point	2750°C
G. Flash point	No data
H. Evaporation speed	No data
I. Combustible(Solid, Gas)	No data
J. Flammable or maximum/minimum of explosion range	-/-
K. Steam pressure	1mmHg (at 1787°C)
L. Solubility	(Water solubility : Insolubility. Solvent soluble A: Soluble A: Acid. Insoluble: Alkali, Alcohol, Aether)
M. Steam density	No data
N. Gravity	7.86 ((Water =1))
O. n-Octanol/Water distribution coefficient	(None)
P. Self-ignition temperature	No data
Q. Decomposition temperature	No data
R. Viscosity	No data
S. Molecular weight	55.85

10. Stability and reactivity

A. Chemical stability	
Al	Leakage has possibilities of fire/explosion. Combustible gas is generated once it is contacted with water. It can be re-extinguished even after finishing extinguishing. It can be extinguished due to heat, spark and flame. Some parts react seriously with water. It can be extinguished if contacted with water or wet moisture. Intake and contact of steam and dusts can cause serious damage or death.
Si	Flammable solid It can cause fire and explosin after serious polymerization. Containers may explode when heated It can be extinguished due to rub, heat, spark and flame. It can be re-extinguished even after finishing extinguishing. It reacts seriously and explosively with water. Some materials can be burned with high heat. Dust and fume can form the air and explosive mixtures. It can generate toxic gas during the fire. Intake and contact of steam and dusts can cause serious damage or death.
Fe	It can be burned due to friction, heat, spark and flame etc. It can be reburned even after extinguishing. It reacts explosively with water. Some materials can be burned with high heat. Dust and fume can form the air and explosive mixtures. Irritating, corrosive and toxic gas can occur during the fire. Intake and contact of steam and dusts can cause serious damage or death. Oxides during the metal fire shows the serious damage to heath. When metal oxides fire show a serious health hazard.
B. Possibility of hazardous reactions	
Al/Si/Fe	Friction, heat, spark, flame, Moisture. Keep away from Heat · Spark · Fire · high heat-Do not smoke
C. Materials to be avoided	
Al/Si/Fe	Water
D. Harmful ingredients during the decomposition	
Al	Irritation, corrosion, harmful gas
Si/Fe	Harmful gas can occur during the fire due to the heat decomposition

11. Toxicological information

A. Information on the likely routes of exposure	
Al/Si/Fe	No data
B. Information of health warning	
Acute toxicity	
Oral	
Al	LD50 15900mg/kg Rat
Si	LD50 3160mg/kg Rat
Fe	LD50 98600mg/kg Rat
Percutaneous	
Al/Si	No data
Fe	LD50 20000mg/kg Guinea pig
Intake	
Al	Dust LC50 0,888mg/l 4hr Rat
Si	No data
Fe	Dust LC50 100mg/m3 6hr Rat
Skin corrosion or irritation	
Al/Fe	Test results on rabbits No corrosivity
Si	Test results on animals No irritaion
Serious eye damage or irritation	
Al/Fe	Test result on rabbits No irritation
Si	Test result on animals Corneal index : ≥45-≤67
Respiratory hypersensitiveness	
Al	Test result on male rats No hypersensitiveness
Si/Fe	No data
Skin hypersensitiveness	
Al	Test result on guinea pigs No hypersensitiveness
Si/Fe	1st Reaig : 8
Carcinogenic	
Occupation safety and health acts	
Al/Si/Fe	No data
Notification of Ministry of employment and labor	

Al/Si/Fe	No data
IARC/OSHA/ACGIH/NTP/EU CLP	
Al/Si/Fe	No data
Germ cell mutagenicity	
Al	In vitro DNA damage assay results were negative in the absence of metabolic activation.
Si	In vitro S.typhimurium TA 1535 results showed ambiguity in the presence of metabolic activation system
Fe	No data
Reproduction-toxicity test	
Al	Test result on rats NOAEL=266mg bw/day
Si/Fe	Test result in pregnant rats showed that fetuses were removed between 6 and 18days
Certain organ toxicity(Exposed once)	No data
Al	Inhalation of material may result in bubbly emphysema, bronchopneumonia and bleeding.
Si/Fe	No data
Certain organ toxicity (Exposed repeatedly)	
Al	Repeated, exposure during long-term effects on the lungs
Si	Affect the nervous system
Fe	No data
Absorption harmfulness	Oral target toxicity test results in rats : Affented by liver
Al/Si/Fe	No data

12. Ecological information

A. Ecotoxicology	
Fishes	
Al/Si	No data
Fe	(Danio rerio : LC0>100,000mg/L 96h analogous substance : 51274-00-1 OECD TG 203)
Crustacean	
Al	NOEC MIN 100mg/l 48hr Daphnia magna
Si	No data
Fe	EC50 MIN 100mg/l 48hr Daphnia magna
Birds	
Al	NOEC MIN_01 0.0052mg/l 72hr Selenastrum capricornutum
Si/Fe	No data
B. Persistence and degradability	
Residue	
Al/Fe	No data
Si	log Kow 57~77(OECD Guideline 117)
Resolvability	
Al/Si/Fe	No data
C. Bioaccumulative potential	
Condensability	
Al/Fe	No data
Si	BCF 77~99
Biodegradable	
Al/Si/Fe	No data
D. Mobility in soil	
Al/Si	No data
Fe	(log kd=5.3)
E. Other adverse effects	
Al	Crustacean : NOEC(Daphnia magna)>100mg/L/48hr
Si/Fe	No data

13. Disposal considerations

A. Disposal methods	
Al/Si/Fe	Dispose the contents and containers according to the regulations stipulated in the waste control act.
B. Special precautions for disposal	
Al/Si/Fe	Dispose contents and containers according to relevant acts

14. Transport information

A. UN No.	
Al	1396
Si	1346
Fe	1383
B. Proper shipping name	
Al	ALUMIUM POWER, UNCOATER
Si	SILICON POWER, AMORPHOUS
Fe	Except for METAL POWDER,FLAMMABLE, N.O.S
C. Hazard Class	
Al	4.3
Si	4.1
Fe	4.2
D. IMDG Packing group	
Al	II
Si	III
Fe	I
E. Marine pollutant	
Al	Applicable
Si/Fe	None
F. Special precautions for user related to transport or transportation measures	
Urgent emergency measurement	
Al/Fe	F-G
Si	F-A
Emergency measurements in case of leakage	
Al	S-O
Si	S-G
Fe	S-M

15. Regulatory information

A. Regulation according to Toxic Chemicals Control Act	
Al/Si/Fe	No data
B. Regulation according to Safety Control of Dangerous Substances Act	
Al/Si	Class 2 meatal 500kg
Fe	Class 2 iron 500kg

C. Regulation according to the Waste Control Act	Designated waste
Al/Si/Fe	
D. Regulation according to foreign act	
USA control information (OSHA regulation)	Not applicable
Al/Si/Fe	
USA control information(CERCLA regulation)	Not applicable
Al/Si/Fe	
USA control information (EPCRA 302 regulation)	Not applicable
Al/Si/Fe	
USA control information(EPCRA 304 regulation)	Not applicable
Al/Si/Fe	
USA control information(EPCRA 313 regulation)	Not applicable
Al/Si/Fe	
USA control information(Materials of Rotterdam convention)	Not applicable
Al/Si/Fe	
USA control information(Materials of Stockholm convention)	Not applicable
Al/Si/Fe	
USA control information(Materials of Montreal Protocol)	Not applicable
Al/Si/Fe	
EU classification information(Results of fixed confirmation)	
Al	Pyr. Sol. 1 Water-react. 2
Si/Fe	Not applicable
EU classification information(Warning phrases)	
Al	H250, H261
Si/Fe	Not applicable
EU classification information(Safety phrases)	
Al	S2, S7/8, S43
Si/Fe	Not applicable

16. Other information

- A. Data source
This Safety Data Sheet was compiled with data and information from the following sources : KOSHA, NITE, ESIS, NLM, SIDS, IPCS,ECHA, HSDB,ICSC
- B. First preparation date July 30. 2014
- C. No. of revision and last revision date
- | | |
|--------------------|---------------|
| No. of revision | 3 times |
| Last revision date | July 04. 2019 |
- D. Others
- This MSDS was composed by referring to MSDS provided by Korea Occupational Safety & Health Agency.