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3rd edition

Safety Data Sheet

Section 1: Chemical Product and Company Information

1.1 Product name	Granulated blast furnace slag
1.2 Company information	
Manufacturer	(Fukuyama) Slag Dept., West Japan Works, JFE Steel Corporation
Address	Kokan-cho, 1-chome, Fukuyama-city, Hiroshima, 721-8510, Japan
Seller and contact point	JFE Steel Corporation
Address	Slag Business Planning Division Slag Sales Dept. Hibiya Kokusai Bldg. 2-3, Uchisaiwai-cho 2-chome Chiyoda-ku, Tokyo 100-0011, Japan
Phone	+81-3-3597-3635
Fax	+81-3-3597-3415
Emergency contact	Slag Business Planning Division Slag Sales Dept. +81-3-3597-3635
1.3 Recommended use	Raw material for cement industry/aggregate/fertilizer, civil engineering

Section 2: Hazards Identification

2.1 GHS classification

This product does not meet the requirement for classification as physical and chemical, health and environmental hazards.

2.2 GHS label

Signal Words: No signal word

2.3 Other hazards

Dust of product can cause mechanical irritation to the eyes and respiratory system.

Leachate may show alkalinity of pH 9-11, after long-term contact with water.

Section 3: Composition and Information on Ingredients

3.1 Simple or Mixture	Mixture compound
3.2 General or Chemical Name	Blast furnace slag CAS No. 65996-69-2
3.3 Component and content	

Granulated blast furnace slag is an amorphous substance, but the following materials may crystallize in a part.

Ingredient	Concentration (% in mass)	CAS No.
Melilite	Not Confirmed	-
Calcium silicate CaO·SiO ₂	Not Confirmed	1344-95-2

3.4 Hazardous component categorized in GHS

Not applicable

Section 4: First-aid Measures

If inhaled: Remove victim to fresh air. If you feel unwell, consult a physician

If on skin: Immediately wash with water

If in eyes: Immediately rinse with clean water. If irritation persists, consult an ophthalmologist.

If ingested: If you feel unwell, consult a physician.

Section 5: Fire-fighting Measures

This product is not flammable. Use fire foam, powder or carbon dioxide extinguishers in case of the risk of fire. Use proper protective equipments and clothes for extinction.

Section 6: Accidental Release Measures

This product is solid. Recover by sweeping and collecting. However, if dust occurs, wear proper protective equipments (e.g. protective gloves, glasses, masks, etc).

Take necessary measures if leachate from this product flows into surrounding water area (e.g. rivers, lakes etc) and its pH becomes higher.

Section 7: Handling and Storage**7.1 Handling**

Secure ventilation in case of handling indoor.

Wear proper protective equipments to avoid the contact onto eyes and skin, etc.

Wash face, hands and mouth etc with clean water after handling.

7.2 Storage

Care should be made so that dust does not occur during storage.

Care should be made so that leachate does not directly flow into surrounding water area (e.g. rivers, lakes etc) because the leachate may show alkalinity.

Section 8: Exposure Control and Personal Protection**8.1 Control/ administrative exposure standards**

Dust: E=3.0mg/m³ (without free silicic acid)

8.2 Threshold values (occupational exposure limits or biological exposure index)

Japan Society for Occupational Health (2015): 1 mg/m³ (2-class dust, inhalable dust)
4 mg/m³ (2-class dust, total dust)

8.3 Protective equipments

Wear proper protective equipments (e.g. protective gloves, glasses, masks, etc) if generation of dust is concerned while handling.

8.4 Engineering measures and hygiene measures

Use ventilating equipment as appropriate to reduce the threshold value in case of handling indoor.

Section 9: Physical and Chemical Properties**9.1 Information on basic physical and chemical properties**

Appearance:	Granulated, particle
Colour:	Ash white
Odour:	None
Melting point	1300 degree Celsius
PH:	Leachate may show alkalinity of pH 9-11, after long-term contact with water
Mass of unit volume:	1.3-1.9 t/m ³
Solubility:	Low with water

9.2 Others

Product may consolidate due to latent hydraulicity in case of long-term storage with the presence of moisture.

Section 10: Stability and Reactivity

This product is stable under normal storage and handling condition, and may consolidate in case of long-

term storage with the presence of moisture.

Leachate may show alkalinity of pH 9-11, after long-term contact with water.

This product is not classified as metal corrosive substance using data on similar slag. The corrosion rate on metal surface of Aluminium and Steel test specimen exposed to Steelmaking slag were max 0.19 mm/year and 0.06 mm/year, respectively, not exceed 6.25 mm/year, when tested in accordance with immersion corrosion test of metal, the United Nations Manual of Tests and Criteria, part 3, section 37.

Section 11: Toxicological information

11.1 Information on toxicological effects

Dust of product can cause mechanical irritation to the eyes and respiratory system.

Leachate may show alkalinity of pH 9-11, after long-term contact with water.

Acute toxicity;	not classified (oral, dermal, inhalative)
Skin corrosion/irritation;	not classified
Serious eye damage/irritation;	not classified
Respiratory or skin sensitisation;	not classified
Germ cell mutagenicity;	classification not possible
Carcinogenicity;	classification not possible
Reproductive toxicity;	classification not possible
STOT-single exposure;	not classified
STOT-repeated exposure;	classification not possible
Aspiration hazard;	classification not possible

11.1.1 Acute toxicity:

Method: OECD Guideline 423

Species: Rat, CrI:CD(SD)

Routes of exposure: oral

Dose: 2000 mg/kg

Exposure time: 14 days

Results: LD50 > 2000 mg/kg NSR

Method: OECD Guideline 436

Species: Rat, CrI:CD(SD)

Routes of exposure: inhalative

Substance: Steelmaking slag

Dose: 5.9 mg/L

Exposure time: 4 hr

Results: LC50 (powder) (4h) > 5.9 mg/L NSR

Data on similar slag was used to classify criteria.

Method: OECD Guideline 402

Species: Rat, CrI:CD(SD)

Routes of exposure: dermal

Dose: 2000 mg/kg

Exposure time: 14 days

Results: LD50 > 2000 mg/kg NSR

No acute inhalative toxicity was expected according to the absence of industrial disease data.

11.1.2 Skin corrosion/irritation

Method: OECD Guideline 404

Species: Japanese white rabbit

Substance: Air-cooled blast furnace slag

Dose: 0.5 g

Exposure time: 1, 24, 48, 72 hr

Results: not irritant

NSR

No irritant effect was expected according to the several rabbit experiment of Air-cooled BF slag in “ECHA CHEM”, Information.

11.1.3 Serious eye damage/irritation

Method: OECD Guideline 405

Species: Japanese white rabbit

Substance: Air-cooled blast furnace slag

Dose: 0.1 g

Exposure time: 1, 24, 48, 72 hr

Results: not irritant

NSR

No irritant effect was expected according to the several rabbit experiment of Air-cooled BF slag in “ECHA CHEM”, Information.

11.1.4 Respiratory or skin sensitisation;

skin sensitisation

Method: OECD Guideline 406

Species: Dunkin-Hartley guinea pig

Substance: Blast furnace slag

Results: not sensitive

ECHA

respiratory sensitisation

No respiratory sensitisation was expected according to the absence of industrial respiratory disease data.

Respiratory sensitisation data was not available in animal experiment because of technical impossibility.

11.1.5 Germ cell mutagenicity;

Method: OECD Guideline 471

Species: *Salmonella typhimurium*, *Echerichia coli*

Substance: Blast furnace slag

Results: Negative in Ames tests, in vitro

ECHA

Based on above data, the classification criteria are not met.

11.1.6 Carcinogenicity; no data available

Air-cooled BF slag was not specifically listed as carcinogens by the National Toxicology Program (NTP), the Occupational Safety and Health Administration (OSHA), or the International Agency for Research on Cancer (IARC).

11.1.7 Reproductive toxicity; no data available**11.1.8 Specific Target Organ Toxicity (STOT) -single exposure;**

Method: OECD Guideline 423

Species: Rat, CrI:CD(SD)

Routes of exposure: oral

Dose: 2000 mg/kg

Exposure time: 14 days

Specific target organ: intrapleural organs, intraperitoneal organs

Results: No abnormalities were macroscopically observed at necropsy in any animals. NSR

Method: OECD Guideline 436

Species: Rat, CrI:CD(SD)

Routes of exposure: inhalative

Substance: Steelmaking slag

Dose: 5234 mg/m³

Exposure time: 4 hr

Specific target organ: intrapleural organs, intraperitoneal organs

Results: No abnormalities were macroscopically observed at necropsy in any animals. NSR

Method: OECD Guideline 402

Species: Rat, CrI:CD(SD)

Routes of exposure: dermal

Dose: 2000 mg/kg

Exposure time: 14 days

Specific target organ: intrapleural organs, intraperitoneal organs

Results: No abnormalities were macroscopically observed at necropsy in any animals. NSR

11.1.9 Specific Target Organ Toxicity (STOT)-repeated exposure; no data available

No STOT was expected according to the absence of industrial disease data in specific organ.

11.1.10 Aspiration hazard; no data available

No aspiration hazard was expected according to the absence of industrial disease data.

Section 12: Ecological Information

12.1 Toxicity

Acute (short-term) toxicity;

not classified

Chronic (long-term) toxicity;

not classified as Category 1, 2, 3

12.1.1 Acute (short-term) toxicity;

Fish:

Method: OECD Guideline 203

Species: *Leuciscus idus*

Dose: 100 mg/l

Exposure time: 96 hr

Results: LC50 > 100 mg/l NSR

Crustacea:

Method: OECD Guideline 202

Species: *Daphnia magna*

Dose: 100 mg/l

Exposure time: 48 hr
 Results: EC50 > 100 mg/l NSR

Algae:
 Method: OECD Guideline 201
 Species: *Pseudokirchneriella subcapitata*
 Dose: 1, 10, 100 mg/l
 Exposure time: 72 hr
 Results: EC50 > 100 mg/l NSR

12.1.2 Chronic (long-term) toxicity;

Crustacea:
 Method: OECD Guideline 211
 Species: *Daphnia magna*
 Substance: Blast furnace slag
 Dose: 48, 153, 488, 1563, 5000 mL mg/l
 Exposure time: 21 d
 Results: NOEC = 1563 mg/l ECHA

Algae:
 Method: OECD Guideline 201
 Species: *Pseudokirchneriella subcapitata*
 Dose: 1, 10, 100 mg/l
 Exposure time: 72 hr
 Results: NOEC = 100 mg/l NSR

12.2 Persistence and degradability: not applicable

12.3 Bioaccumulative potential: no evidence for bioaccumulation potential.

12.4 Mobility in soil: no data available

12.5 Results of PBT and vPvB assessment: no data available.

12.6 Other adverse effects

Take necessary measures for the environment, because leachate may show alkali when this product contacts with water.

No negative ecological effects are expected according to the present state of knowledge.

Section 13: Disposal Considerations

The water that contains these products needs to be treated in accordance with related laws and standards (national, regional or local regulations).

Ask to certificated waste traders or local offices, and dispose appropriately in accordance with related laws and standards.

Section 14: Transport Information

14.1 International transport information

United Nations Identification Number: Not applicable

Marine pollutant: Not applicable

14.2 Domestic transport information (Japan) Not applicable

14.3 Guideline for emergency (Yellow-card) number Not applicable

14.4 Specific measures for safe transport

Make sure to prevent collapse of cargo piles.
Care should be made so that dust does not occur while transporting.
Pay attention to humidity and water leakage.

Section 15: Regulatory Information

Enforcement Order of the Industrial Safety and Health Law (Ordinance on Prevention of Hazards Due to Dust): Dusty work
Pneumoconiosis Act: Dusty work
Working Environment Measurement Act: Specific dusty work

Section 16: Other Information

References

Japan Society for Occupational Health (2015) Recommendation of Occupational Exposure Limits
Chemical Risk Information Platform (CHRIP) (2015) Globally Harmonized System (GHS) Classification Database <http://www.safe.nite.go.jp/ghs./list.html>

ECHA: ECHA (European Chemicals Agency), website “ECHA CHEM”, Information on Registered Substances (2015).

NSR: Nippon Slag Association Report of Air-cooled blast furnace slag and Steelmaking slag

DISCLAIMER

This SDS has been prepared to Japan Industrial Standard JIS Z 7253:2012 and JIS Z 7252:2014 and based on the best available information. However, it may not be sufficient in some cases. It is user's responsibility to modify or update any contents in this SDS regarding information on hazardous properties and/or instruction for safe handling of the product when they would become available.

Precautionary measures in this SDS are only applicable for the normal handling conditions and it is necessary to take the appropriate additional measures to ensure the safe handling depending on your specific conditions and situations.