	Material Safety Data Sheet	Date of Preparation	Mar. 29, 2013
제일연마	[Material Safety Data Sheet]	Date of Revision	Mar. 19, 2019

1. Information on the Chemical Product and Company

A) Product name — Vitrified Grinding Wheel

B) Usage — For grinding/abraising

C) Information on the manufacturer

Company name	Cheil Grinding Wheel Ind. Co., Ltd.
Address	34, 101-gil, Daesong-ro, Nam-gu, Pohang-si, Gyeongbuk, South Korea
Tel	82-54-285-8401

2. Harmfulness and Hazard

A) Classification of harmfulness and hazard — Mutagenicity of reproduction cell: category 2

B) Warning sign item including preventive action statement

Pictogram

Signal statement	Warning
Harmfulness and hazard statement	H341 Suspicious of causing genetic defects
Preventive action statement	P202 Do not deal with the chemical material before you read and understand all safety preventive action statements. P280 Wear protective gloves, clothes, and glasses, and face protective equipment. P308+P313 Seek a medical action or advice, if you are exposed to or worried to be exposed to the chemical material.
Response	P314 Receive the medical examination of a medical institution (doctor), if you feel discomfort.
Storage	P405 Store the product in a storage where a locking system exists.
Scrapping	P501 Scrap the vessel of the content (according to the specified details of the relevant laws and regulations.

C. Other harmfulness and hazard not included in the harmfulness and hazard classification standards (i.e.: dust, explosion hazard)

Health	No data available
Fire	No data available
Response	No data available

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3. Components and Content

Component	Name	Content	CAS.NO
Abrasive	aluminium oxide	70~80%	1344-28-1
Glue	Clay (Gray)	15~25%	Classification not confirmed

4. Emergency Measures

A) In case the chemical material contacts eyes	Receive an emergency medical action. Wash out your skin and eyes with running water for more than 20 min, when a chemical material contacts with the skin and eyes.
B) In cases a chemical material contacts skin	Prevent the spread of contaminated part upon light contact with the skin. Receive an emergency medical action. Wash out your skin and eyes with running water for more than 20 min, when a chemical material contacts with the skin and eyes. Remove the contaminated clothes and shoes, and quarantine the contaminated area.
C) In the case of inhalation	Seek a medical action/advice, if you are exposed or worried to be exposed to the chemical material. keep the exposed person warm and stabilize him/her. If a person ate or inhaled the chemical material, use a proper breathing medical equipment without performing mouth-to-mouth resuscitation. Move the person who had the chemical material to a place with fresh air.
D) In the case of eating	Seek a medical action or advice, if you are exposed or worried to be exposed to the chemical material. If a person ate or inhaled the chemical material, use a proper breathing medical equipment without performing mouth-to-mouth resuscitation.
E) Cautions by a doctor	Let the medical personnel recognize the chemical material and take a protective action

5. How to Cope with Explosion and Fire

A) Proper (improper) fire extinguishing material	Use alcohol foam, CO2, or water spray related to the material. Upon suffocating fire extinguishment, use dry sand or earth.
B) Specific harmfulness from the chemical material	A vessel can be exploded upon being heated. Toxic gas can be generated, as the chemical material can be decomposed at high temperature. Although nonflammable materials are not burned, they may cause corrosive and toxic fumes through decomposition upon being heated. Although some can be burned, they are not easily flammable.

C) Protective equipment to be worn upon fire extinguishment and preventive action	Rescuers need to wear proper protective equipment. Dig a ditch to dispose fire extinguishing water and contain it there, and then make sure the materials not to be scattered to dispose fire extinguishing water. Be careful because the chemical material can be melted and transported (carried). Move the vessel from the fire site, if it is not dangerous. Extinguish fire by maintaining safety distance beyond the fire site. In the case of a large scale fire upon tank fire, use unmanned fire extinguishing equipment. If not, step back and let it burn. Cool off the vessel with lots of water, even after the fire is extinguished in the case of a tank fire. Immediately step back, if high sound is heard from the pressure discharge device, or if the tank color changes upon fire breaking out. In the case of a tank fire, extinguish it from a maximum distance, or use unmanned fire extinguishing equipment. Step back from the tank wrapped in flames in the case of a tank fire.

6. How to Cope with Leakage Accident

A) Actions and protective equipment required to protect human body	Remove all flammable sources. Immediately wipe out the spilled material, and comply with the preventive actions specified in the clause of protective equipment. Stop leakage, if it is not dangerous. Do not touch any damaged vessel or leaked material without wearing proper protective clothes. Prevent diffusion by covering with a plastic sheet. Be careful about the materials and conditions to be avoided.
B) Actions required to protect the environment	Prevent the inflow to the water channel, drain, basement, and sealed space.
C) How to clean and remove	Absorb the spilled material with an inactive material (for example, dry sand or earth), and put it in a chemical waste vessel. Absorb the liquid, and wash out the contaminated area with detergent and water.

7. How to Handle and Store

A) Safe handling method:	Do not handle the chemical material before you read and understand all safety preventive action statements. Avoid contacting the chemical material with the eyes and skin. Perform ventilation by using the total ventilation or local exhaust device. Prevent dust generation and dust scattering.
B) Safe storage method	Store the material in a storage with a locking system. Store the material in a cool and dry place where ventilation is smoothly conducted.

8. Prevention of Exposure and Personal Protective equipment

A) Exposure standards of chemical materials and biological exposure standards, etc.

Domestic regulations	TWA – 10mg/m3 / in the case of exposure to metal dust TWA – 5mg/m3 / in the case of exposure to welding fume TWA – 5mg/m3 / in the case of exposure to fatigue powder
ACGIH regulations	TWA 1 ㎎/㎥
Biological exposure standards	No data available
Other exposure standards	No data available

B) Proper engineering management	Use process segregation and local exhaust, or conduct other engineering Mgt controlling air level under the exposure standard.
C) Personal protective equipment	In the case of exposure to metal dust
Protection of respiratory organ	Wear protective equipment for breathing that gained KOSHA certification suitable for the physical and chemical characteristics of the exposed material. If exposure concentration is lower than 100 mg/m3, wear half-face breathing protective equipment equipped with a proper type filter. If exposure concentration is lower than 250 mg/m3, wear a loose-fitting hood /helmet type electric motor breathing protective equipment or a consecutive flow-type dust mask equipped with a proper filter. If exposure concentration is lower than 500 mg/m3, wear a full-face breathing protective equipment, air supply type continuous flow type or pressure requiring type half-face breathing protective equipment equipped with a proper filter. If exposure concentration is lower than 10000 mg/m3, wear a full-face, helmet hood type, pressure requiring air supplied mask equipped with a proper filter. If exposure concentration is lower than 100000 mg/m3, wear SCBA (self contained breathing apparatus) or pressure requiring SCBA breathing protective equipment.
Protection of eyes	Wear an air penetration google to protect eyes from particle materials that may cause irritation to eyes or other health disorder. Install emergency washing facility (shower style) and face washing facility in a position where workers can approach easily.
Protection of hands	Wear protective gloves made of proper materials in consideration of the physical and chemical properties of the chemical material.
Protection of body	Wear proper protective clothes made of proper materials in consideration of the physical and chemical properties of the chemical material.

9. Physical and Chemical Characteristics

A) Appearance

State	Solid
Color	Brown to black
B) Smell	No smell
C) Threshold of smell	No data available
D) pH	No data available
E) Melting point/freezing point	N/A
F) Initial stage boiling point and range	N/A

G) Flash point	No data available
H) Evaporation speed	(N/A)
H) Flammability (solid, gas)	No data available
I) Upper limit/lower limit of combustion or explosion range	– / –
J) Steam pressure	N/A
K) Solubility	<0.1 ㎎/ℓ (insolubility)
L) Steam density	(N/A)
M) Specific gravity	2.2
N) n-octanol/water distribution coefficient	No data available
O) Natural ignition temperature	No data available
P) Decomposition temperature	No data available
Q) Viscosity	No data available
R) Molecular weight	No data available

10. Stability and Reactivity

A) Chemical stability and harmful reaction possibility	Toxic gas can be generated through decomposition at high temperature. The vessel can be exploded upon being heated. Although some can be burned, they are not easily flammable. Although nonflammable material is not burned, it may generate corrosive/toxic fume through decomposition upon being heated.
B) Conditions to be avoided	Ignition sources including heat, spark, flame
C) Materials to be avoided	Flammable material and reducing material
D) Harmful materials generated upon decomposition	Corrosive/toxic fume Irritative, corrosive, and toxic gas

11. Information on Toxicity

A) Information on exposure path with a high possibility	No data available
B) Information on harmfulness to health	
Acute toxicity	No data available
Oral	LD50 > 10000 ㎎/㎏ Rat (no death during the observation period (OECD Guideline 401)).
Percutaneous	No data available
Inhalation	Dust LC50> 2.3 ㎎/ℓ 4 hr Rat (no death, EPA 40 CFR 158, OECD Guideline 403, GLP).
Corrosive or irritative to skin	As a result of observing the rabbit (male) in 24, 48, and 72 hours after exposing 0.5g to the rabbit (male) for 4 hours, no irritation (OECD Guideline 404, GLP).
Severe eye damage or irritation	As a result of eye irritation test for 72 hours to rabbit (male), no irritation (OECD Guideline 405, GLP)
Hypersensitive respiratory organ	As a result of respiratory organ hypersensitivity test targeting a mouse (male), non-hypersensitive
Dermal hypersensitivity	As a result of testing skin hyper sensitivity to a guinea pig, non-hyper sensitive (OECD Guideline 406, EPA OPPTS 870.2600, GLP)
Carcinogenic	No No No data available
Occupational Safety and Health Act	No No No data available
Notification of the Labor Ministry	No No No data available
IARC	No No No data available
OSHA	No No No data available
ACGIH	No No No data available

NTP	No No No data available
EU CLP	No No No data available
Mutagenicity of reproduction cell	1) Ambiguous result on the aluminum oxide with 50-200 μm in size mammalian in the somatic cell study: bone marrow chromosome aberration): positive result on the 30nm particle: positive result on the 40nm particle. 2) In a test of oral administered red blood cell micor-nucleus using a rat (mammal's body cell, in vivo mammalian somatic cell study: erythrocyte micronucleus, negative result on the aluminum oxide with 50-200 μm in size; positive result on the 30nm particle; positive result on the 40nm particle 3) In an oral administered DNA damage and recovery test using a rat, (in vivo mammalian cell study: DNA damage and/or repair), negative result on the aluminum oxide with 50-200 μm; positive result on the 30nm particle; positive result on the 40nm particle ->From the above results, the aluminum oxide with nano size is judged to have mutagenicity.
Toxicity of reproduction	As a result of a repetitive combination experiment of study on administration toxicity alongside the regeneration/generation toxicity screening test to rats (female/male), no side effect was observed (OECD Guideline 422, GLP)
Toxicity on specific target organ (1 time exposure)	As a result of an acute toxicity (oral) test to a rat (female), there was no treatment effect. LD50 >2000 mg/kg bw (OECD TG 423, GLP).
Toxicity on specific target organ (repeated exposure)	As a result of repeated oral administration of toxicity (28 days) using a rat (male), LOAEL: 141 or 302 mg/kg, no important result was observed (OECD TG 407).
Harmfulness of inhalation	No data available

12. Impacts on the Environment

A) Ecological toxicity	
Fish	LC50 0.108 ㎎/ℓ ~ 0.078 ㎎/ℓ 96 hr Pimephales promelas ()|※ Source: ECHA
Crustaceans	LC50 >3.69 ㎎/ℓ 48 hr Ceriodaphnia dubia ()|※ Source: ECHA
Birds	EC50 >0.024 ㎎/ℓ 96 hr Scenedesmus subspicatus ()|※ Source: ECHA
B) B. Persistency and decomposability	
Persistency	No data available
Decomposability	No data available
C) Biological condensability	
Condensability	No data available
Bio degradability	No data available
D) Soil movability	No data available
E) Other harmful impacts	Fish: Pimephales promelas, NOEC 28d 7.1mg/L, ECHA, Crustaceans: Daphnia magna, NOEC 28d 1.89mg/L, ECHA, Birds: Pseudokirchneriella subcapitata, 96hr NOEC ≥0.004mg/L, OECD Guideline 201, Alga, Growth Inhibition Test, GLP. Because the material is no sparingly soluble material and water solubility is less than 1mg/L, acute toxicity is not classified. ※Source:ECHA

13. Cautions upon Scrapping

A) How to scrap	Scrap using one of the following methods: 1. Solidify. 2. Reclaim in a management type reclaiming facility where designated waste can be reclaimed. 3. Incinerate waste catalyst including flammable materials. 4. In the case of incinerating waste catalyst including materials belonging to halogen family, perform it at high temperature.
B) Cautions upon scrapping	Scrap the vessel of the content (according to the specified details of the relevant laws and regulations)

14. Information Required for Transportation

A) UN No.	No UN transport-hazardous material classification information available
B) B. Proper UN ship name	N/A
C) Hazard grade in transportation	N/A
D) Vessel grade	N/A
E) Marine pollutant	N/A
F) Things that users need to know or any special safety measures in relation to transportation or transportation means	
Emergency action upon fire	N/A
Safety measures upon leakage	N/A

15. Current Status of Legal Regulations

A) Regulations by the Occupational Safety and Health Act	Materials for working environment measurement (measurement cycle: metal: 6 months) (metal dust, fume) The materials concerned: CAS.NO: 1344-28-1 Harmful materials to be managed The materials concerned: CAS.NO: 1344-28-1 Materials for special health diagnosis (diagnosis cycle: 12 months) The materials concerned: 1344-28-1 Materials for exposure criteria setting The materials concerned CAS.NO: 1344-28-1
B) Regulations by the Chemical Mgt Act	No data available
C) Regulations by the Safety Mgt Act of Hazardous Materials	No data available
D) Regulations by the Waste Mgt Act	Designated waste. The materials concerned: CAS.NO: 1344-28-1, 13397-26-7

E) Regulations by other domestic and foreign laws

Domestic regulations	
Persistent Organic Pollutants Mgt Act	N/A
Foreign regulations	
U.S. Mgt Information (OSHA Regulat Regulations)	N/A
U.S. Mgt Information (CERCLA Regulations)	N/A
U.S. Mgt Information (EPCRA 302 Regulations)	N/A
U.S. Mgt Information (EPCRA 304 Regulations)	N/A
U.S. Mgt Information (EPCRA 313 Regulations)	N/A
U.S. Mgt Information (Materials under the Rotterdam Convention)	N/A
U.S. Mgt Information (Materials under the Stockholm Convention)	N/A
U.S. Mgt Information (Materials under the Montreal Protocol)	N/A
EU Classification Information (confirmed classification result)	N/A
EU Classification Information (hazard statement)	N/A
EU Classification Information (safety statement)	N/A

16. References

A) Data Sources

A. Data sources
ICSC 0351 (state)
ICSC 0351 (color)
ICSC 0351, ECHA (E. Melting point/freezing point)
ICSC 0351 (F. Initial boiling point and boiling point range)
ECHA (K. Steam pressure)
ECHA (L. Solubility)
ICSC 0351 (N. Specific gravity)
ICSC 0351 (e. Molecular weight)
ECHA (Oral)
ECHA (Inhalation)
ECHA (Corrosive or irritative to skin)
ECHA (Severe eye damage or irritation)
ECHA (Respiratory organ hypersensitivity)
ECHA (Dermal hypersensitivity)
ECHA (Mutagenicity of reproduction cell)
ECHA (Reproduction toxicity)
ECHA (Toxicity on specific target organ (1 time exposure))
ECHA (Toxicity on specific target organ (repeated exposure)
ECHA (Fish)
ECHA (crustaceans)
ECHA (Birds)
ECHA(E. Other Harmful Impacts)

B) Initial preparation date March 29, 2013

C) No. of revision and last date of revision 5, March 15, 2019

D) Others

○ Although the MSDS was prepared on the basis of collectable information, we do not guarantee the included data, hazard, and toxicity evaluation.

Before using the product, investigate the organization that will use the product, and the laws and regulations of the area and country where it belongs. .

Users need to comply with all the laws and regulations for the safe handling and the use of the product, and the users are responsible for judging the conformity of the product in the intended usage.

All chemical products should be handled by users recognizing that they have unknown hazards and toxicity according to use or storage condition (period).

Any details contained herein shall not be the suggestion for the product sales.