

SAFETY DATA SHEET (SDS)

1. Chemical and Manufacturer Information

1.1 Product Name

Ceramic, Coated Ceramic and Ceramic Tools

1.2 Company Information

Company Name : Sumitomo Electric Hardmetal Corp.
 Address : 1-1-1, Koya-kita, Itami, Hyogo, 664-0016 Japan
 Phone Number : +81-72-771-0555
 Fax Number : +81-72-773-1723
 Emergency Phone Number : +81-72-771-0555 (Environmental administrator)

1.3 Recommended Use and Restrictions on Use of the Ceramic

Cutting tools mainly for metallic materials, wear-resistant tools for plastic forming process, tools for macadam, civil engineering, and urban development, etc.

Do not use for a purpose other than the above use.

1.4 Attention to the Phase/State of the Ceramic

- Ceramic as solid state like cutting tools is chemically stable and safe at explosive, flammable, combustible, pyrophoric, water-reactive, and oxidizability under normal environment.
- Ceramic is safe for use as the cutting tools (grinding, machining, rolling for metals) under normal condition.
- This SDS informs about the dust, fume or vapor which occur from Ceramic producing process such as raw material powder handling and grinding.

2. Hazards Identification

2.1 GHS classification

GHS classification for the hazards of cobalt alone in below,

(When cobalt is included as ingredients of Ceramic.)

Health Hazard	<ul style="list-style-type: none"> • Respiratory sensitization • Skin sensitization • Carcinogenicity • Reproductive toxicity • Specific target organ toxicity (Single exposure) • Specific target organ toxicity (Repeated exposure) 	Category1 Category1 Category2 Category2 Category3 (Respiratory tract irritation) Category1 (Respiratory)
Environmental Hazard:	• Hazardous to the aquatic environment	Category1

GHS classification for the hazards of nickel alone in below,

(When nickel is included as ingredients of Ceramic.)

Health Hazard	<ul style="list-style-type: none"> • Respiratory sensitization • Skin sensitization • Carcinogenicity 	Category1 Category1 Category2
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	<ul style="list-style-type: none"> • Specific target organ toxicity (Single exposure) • Specific target organ toxicity (Repeated exposure) 	Category1 (Respiratory tract irritation) Category1 (Respiratory)
Environmental Hazard:	<ul style="list-style-type: none"> • Hazardous to the aquatic environment (long-term exposure) 	Category4

GHS classification for the hazards of chromium alone in below,
 (When chromium is included as ingredients of Ceramic.)

Health Hazard	<ul style="list-style-type: none"> • Serious damage to the eye • Respiratory sensitization • Skin sensitization • Germ-cell mutagenicity • Specific target organ toxicity (Single exposure) • Specific target organ toxicity (Repeated exposure) 	Category2B Category1 Category1 Category2 Category2 (Systemic toxicity) Category3 (Respiratory tract irritation)
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※ Other hazards and harmful effects which are not listed are unclassifiable or non-applicable by GHS.

2.2 GHS label element

	The dust, fume or vapor which occur from Ceramic producing process.	Ceramic, Ceramic tools
Hazard Pictograms :		Not applicable
Signal Words :	Danger	Not applicable
Hazard Statements :	<ul style="list-style-type: none"> • Risk of causing allergies, asthma or breathing difficulties if inhaled. • Risk of causing an allergic skin reaction. • May cause cancer. • May cause adverse effects on fertility or the unborn child. • Risk of respiratory irritation. • Cause of respiratory failure due to long-term or repetitive exposure. • May be harmful to aquatic life due to long-term effects 	Not applicable

<p>recautionary Statements :</p>	<p>【Prevention】</p> <ul style="list-style-type: none"> • Do not handle until all safety precautions have been read and understood. • Use appropriate personal protection and ventilation system keeping away from exposure. • Wear suitable protective gloves. • When insufficient ventilation, wear respirator as required. • Do not breathe dust, fume or vapor. • Do not eat, drink or smoke in handling area. • Wash skin thoroughly after handling. • Do not release into the environment. <p>【Responses】</p> <ul style="list-style-type: none"> • If inhaled, move to fresh air and take a rest with posture easy to breathe. • If respiratory symptoms occurs, contact a doctor. • When feeling ill, get medical advice/attention. • Take off contaminated clothing and wash before reuse. • If on skin, rinse away immediately with a large amount of water and soap. • If skin irritation occurs, contact a doctor and get medical advice/attention. • If exposed or concerned, get medical advice/attention. • If dust is in eyes, immediately wash away with clean water (remove the contact lenses if possible). If irritation persists, get medical advice/attention. <p>【storage】 Avoid the sudden temperature change and the humid conditions.</p>	<p>【Prevention】</p> <ul style="list-style-type: none"> • Do not handle until all safety precautions have been read and understood.
	<ul style="list-style-type: none"> • If a large amount of dust is swallowed, get medical advice/attention after ingesting plenty of water to dilute. 	
	<p>【Disposal】</p> <ul style="list-style-type: none"> • Dispose of contents/container to an approved waste disposal plant under the laws. 	

3. Composition / Information on Ingredients

- Ceramic can be coated with the following materials:
AlN, Al₂O₃, TiC, TiCN, TiN, (Al,Cr)N, (Ti,Al,Cr)N, Cr₃C₂, CrN, (Ti,Si)N, (Ti,Zr)N, WC, VC
- Distinction of a single product or mixture : Mixture (Alloy)

Main ingredients and Contents

Material	Chemical Formula	CAS No.	Classification No. by PRTR Law	Enforcement Serial No. by Industrial Safety and Health Laws	Weight % of ingredients
Aluminum oxide	Al ₂ O ₃	1344-28-1	Not applicable	Appendix 9-189	0-100
Zirconium oxide	ZrO ₂	1314-23-4	Not applicable	Appendix 9-313	0-15
Ytterbium oxide	Yb ₂ O ₃	1314-37-0	Not applicable	Not applicable	0-5
Yttrium oxide	Y ₂ O ₃	1314-36-9	Not applicable	Appendix 9-54	0-15
Magnesium oxide	MgO	1309-48-4	Not applicable	Not applicable	0-5

Chromium oxide	Cr ₂ O ₃	1308-38-9	Class 1-No.87 Attached	Appendix 9-142	0-1
Cerium oxide	CeO ₂	1306-38-3	Not applicable	Not applicable	0-5
Dysprosium oxide	DY ₂ O ₃	1308-87-8	Not applicable	Not applicable	0-1
Lanthanum oxide	La ₂ O ₃	1312-81-8	Not applicable	Not applicable	0-5
Silicon carbide	SiC	409-21-2	Not applicable	Appendix 9-336	0-40
Zirconium carbide	ZrC	12070-14-13	Not applicable	Not applicable	0-10
Aluminum nitride	AlN	24304-00-5	Not applicable	Not applicable	0-20
Silicon nitride	Si ₃ N ₄	12033-89-5	Not applicable	Not applicable	0-100
Titanium nitride	TiN	25583-20-4	Not applicable	Not applicable	0-30
Cobalt	Co	7440-48-4	Class 1-No.132 Attached	No. 9-172 Table	0-0.5
Cobalt oxide	Co ₃ O ₄	1308-06-1	Class 1-No.132 Attached		
Nickel	Ni	7440-02-0	Class 1-No.308 Attached	No. 9-418 Table	0-0.5
Nickel oxide	NiO	1313-99-1	Class 1-No.309 Attached		
Tungsten carbide	WC	12070-12-1	Not applicable	Not applicable	0-85
Tantalum carbide	TaC	12070-06-3	Not applicable	Not applicable	0-20
Titanium carbide	TiC	12070-08-5	Not applicable	Not applicable	0-70

*For the details regarding the content of the designated chemical material such as cobalt compound, nickel compound, chromium compound (effective digit: 2), please contact to the above supplier.

4. Emergency and First Aid Procedures

4.1 Inhalation

If high concentration of dust is inhaled or the worker exhibits trouble breathing (cough, pant, etc), remove to fresh air. If breathing is difficult, administer oxygen.

If breathing has stopped, try artificial respiration. Seek immediate medical attention.

If irritation or a rash is continuous for a long period , seek medical attention.

4.2 Skin Contact

When dust contacts the skin, remove the contaminated clothes and clean the skin with soap and water. If irritation or a rash is continuous for a long period , seek medical attention.

4.3 Eye Contact

When dust gets in eye flush with running water. If the irritation persists , seek medical attention.

4.4 Ingestion

When a large volume of dust is swallowed drink plenty of water to dilute and seek immediate medical attention.

5. Fire Procedures

5.1 Extinguishing Media (Prohibited Media)

When ignition of dust occurs , use dry sand, expanded vermiculite, dilatable perlite, ABC type (for general, oil and electricity fire) powder fire extinguisher or water, but when the dust contains light metals for example magnesium or aluminum, do not use water.

5.2 Unusual Fire and Explosion

If dust is in a special condition, for example it has a very small particle size and is mixed with low flash point grinding oil, it might spontaneous ignite. If this dust in this condition is then sprayed in the air it might reach the explosion point.

5.3 Special Protective Equipment for firefighters and Precaution

Use dust-proof mask or self contained breathing apparatus.

6. Spill and Leak Procedures

6.1 Attention to the Human Body. Protective Equipment and Emergency Procedures

Clean-up personnel should wear personal protective equipment including respiratory protection which is appropriate for the magnitude of exposure.

6.2 Attention to the Environment

Dust must be treated as an industrial waste and must not leak to the water system.

6.3 Removal Procedures

For removal of dust, isolate area and do not walk through else material will get scattered.

Remove dust using a vacuum equipped with a filter sufficient to remove metal dust and prevent their circulation (a high efficiency particulate air (HEPA) filter is recommended).

If an appropriate vacuum is unavailable, use mist , a wet dust mop or another wet clean-up method to remove the dust.

7. Handling and Storage

7.1 Handling

Ceramic is stable thus there is almost no effect to the human health, but long time or repetitive contact to dust or grinding liquid which contains cobalt and nickel, may damage the skin. When grinding or machining Ceramic cobalt and nickel contained dust may be dispersed, use extraction to minimize the dust exposed to workers. Remove ground sludge as well as dust. Since the specific gravity of Ceramic is large, treat large products and large quantities as heavy objects. Wash hands thoroughly before eating, drinking and smoking. Do not eat, drink and smoke in the Ceramic handling area. Have a periodical medical examination.

7.2. Storage

Avoid drastic changes of temperature and high humidity.

8. Exposure Controls and Personal Protection

Use a dust protective mask and a respirator, and set up local exhaust ventilation to prevent airborne dust which exceeds the permissible level on the following table. It is to be noted that management concentration of the cobalt (and its inorganic compounds) is to be 0.02mg/m³ in accordance with the working environment assessment standard by Japanese Minister of Health, Labour and Welfare under the paragraph (2), Article 65-2 of the Industrial Safety and Health Act in Japan.

In addition, cobalt (and its inorganic compounds) in the storage or handling, and that to take the necessary action conforming to the Ordinance on Prevention of Hazards due to Specified Chemical Substances.

8.1 Permissible exposure limit in working environments (reference value)

Ingredients	Chemical formula	*OSHA PEL	**ACGIH TLV	***JSOH OLEs
		mg/m ³ (Concentration of metal dust particles)	mg/m ³ (Concentration of metal dust particles)	mg/m ³ (Concentration of metal dust particles)
Aluminum oxide	Al ₂ O ₃	5 (as Al)	10	N/A
Zirconium oxide	ZrO ₂	5 (as Zr)	5 (as Zr)	0.5 (as Zr)
Ytterbium oxide	Yb ₂ O ₃	N/A	N/A	N/A

Yttrium oxide	Y2O3	1 (as Y)	1 (as Y)	N/A
Magnesium oxide	MgO	15	10	N/A
Chromium oxide	Cr2O3	0.5 (as Cr)	0.5 (as Cr)	0.5 (as Cr)
Cerium oxide	CeO2	N/A	N/A	N/A
Dysprosium oxide	DY2O3	N/A	N/A	N/A
Lanthanum oxide	La2O3	N/A	N/A	N/A
Silicon carbide	SiC	5	3	N/A
Zirconium carbide	ZrC	15	5	N/A
Aluminum nitride	AlN	5 (as Al)	1 (as Al)	N/A
Silicon nitride	Si3N4	N/A	N/A	N/A
Titanium nitride	TiN	N/A	N/A	N/A
Cobalt	Co	0.1 (as Co)	0.02 (as Co)	0.05 (as Co)
Cobalt oxide	Co3O4			
Nickel	Ni	1.0 (as Ni)	1.5 (as Ni)	1.0 (as Ni)
Nickel oxide	NiO			
Tungsten carbide	WC	5 (as W)	5 (as W)	N/A
Tantalum carbide	TaC	5 (as Ta)	5 (as Ta)	N/A
Titanium carbide	TiC	N/A	N/A	N/A

*OSHA: Occupational Safety and Health Administration U.S. Department PEL: Permissible Exposure Limit.

**ACGIH: American Conference of Governmental Industrial Hygienists Inc. TLV: Threshold Limit Value

***JSOH: Japan Society for Occupational Health

****N/A : Not Applicable

8.2 Respiratory protection

Wear respiratory protective equipment or dust mask for protection against dust.

8.3 Hands protection

Wear protective gloves for protection against dust.

8.4 Eye and Face protection

Wear protective glasses or chemical safety face protections for protection against dust.

8.5 Skin and body protection

Avoid direct contact of dust with skins.

In order to remove attached dust, do not shake off clothes or pieces of cloth, but be sure to remove dust by laundering or absorbing with a vacuum cleaner with suitable filters. Change contaminated clothes to clean clothes.

8.6 Hygiene Measure

Wash skin thoroughly after handling.

9. Physical and Chemical Properties

Physical State	Solid
Appearance:	White or Dark gray color *The color can change with coating materials.
Odor:	Odorless
Melting Point/ Freezing point:	No data available
Boiling Point or Initial Boiling Point:	No data available
Explosion Limit、Flammability Limit、Flash Point、Auto-ignition Temperature、 Decomposition Temperature:	No data available
pH:	No data available
Dynamic viscosity	No data available
Solubility:	Insoluble

Vapor Pressure:
Specific Gravity:

No data available
3.0 – 11.0

10. Stability and Reactivity

There is a risk of ignition under special conditions that the particle size of Ceramic material or dust which occurs in processing is very fine and the particle and grinding oil with low flash point are mixed. There is a risk of fire or explosion if dust disperse into the air under the special condition that are easy to ignite.

*The each metallic ingredients (cobalt, nickel and chromium) for composing the Ceramic has the following information about stability and reactivity under specific conditions.

Stability and reactivity of cobalt alone in below,

(When cobalt is included as ingredients of Ceramic.)

Reactivity, Chemical Stability:

Stable to heat and contact with water
Ignite spontaneously in air

Hazardous reactions:

It reacts with strong oxidizing agents
It reacts violently with oxygen, and it poses a risk of fire or explosion

Conditions to avoid:

It reacts violently with acid to generate hydrogen

Incompatible materials:

Contact with incompatible materials

Hazardous decomposition products:

Strong oxidizing agents, acid

By combustion, cobalt oxide and fumes of cobalt oxide may occur

Stability and reactivity of nickel alone in below,

(When nickel is included as ingredients of Ceramic.)

Reactivity, Chemical Stability:

It is considered stable in storage and handling in accordance with the laws and regulations

Hazardous reactions:

Metallic nickel is usually stabilized against oxidation by the oxide film, fresh metal surfaces without oxide film is rapidly oxidized by air. Thus, fresh metallic nickel powder, there is a risk of ignition in air.

Conditions to avoid:

No data available

Hazardous decomposition products:

No data available

Stability and reactivity of chromium alone in below,

(When chromium is included as ingredients of Ceramic.)

Reactivity, Chemical Stability:

Stable under normal use conditions

Hazardous reactions:

It reacts violently with strong oxidizing agents(ex. hydrogen peroxide), and it poses a risk of fire or explosion

It reacts with dilute hydrochloric acid, dilute sulfuric acid.

Conditions to avoid:

Contact with incompatible materials

There is a risk of dust explosion if chromium in powder or granular form, mixed with air

Incompatible materials:

Strong oxidizing agents, Dilute hydrochloric acid, Dilute sulfuric acid, Alkaline substance, Alkaline carbonate

Hazardous decomposition products:

By combustion, toxic fumes and gas may occur

11. Toxicological Information

11.1 Acute Toxicity

No data available on Ceramic.

11.2 Skin Corrosion / Irritation

No data available on Ceramic.

11.3 Serious Eye Damage / Irritation

No data available on Ceramic.

11.4 Respiratory or Skin Sensitization

No data available on Ceramic.

11.5 Germ Cell Mutagenicity

No data available on Ceramic.

11.6 Carcinogenicity

No data available on Ceramic.

11.7 Reproductive Toxicity

No data available on Ceramic.

11.8 Specific Target Organ / Systemic Toxicity (Single Exposure)

No data available on Ceramic.

11.9 Specific Target Organ / Systemic Toxicity (Repeated Exposure)

No data available on Ceramic.

11.10 Aspiration Hazard

No data available on Ceramic.

12. Ecological Information

12.1 Ecotoxicity

There has been no evidence on Ceramic

12.2 Persistence and Degradability

There has been no evidence on Ceramic

12.3 Bioaccumulation

There has been no evidence on Ceramic

12.4 Mobility in soil

There has been no evidence on Ceramic

12.5 Hazardous to the ozone layer

There has been no evidence on Ceramic

13. Disposal Consideration

Method for safe and environmental preferred disposal and recycle :

The main materials, such as tungsten and cobalt, are rare metals, and should be collected and recycled.

In the case of disposal, it must be handled, based on Waste Disposal and Public Cleaning Law.

(Domestic Law)

14. Transport Information

UN Number:	Not applicable
Proper Shipping Name	Not applicable
UN Hazard Class:	Not applicable
Packing Group :	Not applicable

Marine Pollutant: Not applicable

*When transporting a powder of metallic ingredients (cobalt, nickel) for composing the Ceramic, there is a possibility that it is necessary to take appropriate action in accordance with the relevant provisions established by IMO (International Maritime Organization), ICAO (International Civil Aviation Organization), IATA (International Air Transport Association).

15. Regulatory Information (Japanese Applicable Law)

• Law for Pollutant Release and Transfer Register (PRTR)

Cobalt : “Class 1 designated chemical substances”, Cabinet Order No.132
Cobalt oxide : “Class 1 designated chemical substances”, Cabinet Order No.132
Nickel : “Class 1 designated chemical substances”, Cabinet OrderNo.308
Nickel oxide : “Class 1 designated chemical substances”, Cabinet OrderNo.309
Chromium oxide : “Class 1 designated chemical substances”, Cabinet OrderNo.87

• Occupational Safety & Health Administration Law.

Cobalt: The substances are defined in the Article 57-2 of the Act, and the cobalt is listed by No.172 in Appended Table9 in the Article 18-2 of the Enforcement Order as “Dangerous or Harmful Substances to be notified their names, etc.”

Article 2, Paragraph 1, Items 2 and 5 of Ordinance on Prevention of Hazards due to Specified Chemical Substance, Specified chemical substance class 2, Management class 2.

When the content of cobalt and cobalt oxide is less than 1%, the Ordinance on Prevention of Hazards due to Specified Chemical Substance is not covered.

Nickel: The substances are defined in the Article 57-2 of the Act, and the nickel is listed by No.418 in Appended Table9 in the Article 18-2 of the Enforcement Order as “Dangerous or Harmful Substances to be notified their names, etc.”

Aluminum oxide: The substances are defined in the Article 57-2 of the Act, and the aluminum oxide is listed by No.189 in Appended Table9 in the Article 18-2 of the Enforcement Order as “Dangerous or Harmful Substances to be notified their names, etc.”

Zirconium oxide: The substances are defined in the Article 57-2 of the Act, and the zirconium oxide is listed by No.313 in Appended Table9 in the Article 18-2 of the Enforcement Order as “Dangerous or Harmful Substances to be notified their names, etc.”

Titanium oxide: The substances are defined in the Article 57-2 of the Act, and the titanium oxide is listed by No.191 in Appended Table9 in the Article 18-2 of the Enforcement Order as “Dangerous or Harmful Substances to be notified their names, etc.”

Yttrium oxide: The substances are defined in the Article 57-2 of the Act, and the titanium oxide is listed by No.54 in Appended Table9 in the Article 18-2 of the Enforcement Order as “Dangerous or Harmful Substances to be notified their names, etc.”

Chromium oxide: The substances are defined in the Article 57-2 of the Act, and the titanium oxide is listed by No.142 in Appended Table9 in the Article 18-2 of the Enforcement Order as “Dangerous or Harmful Substances to be notified their names, etc.”

Silicon carbide: The substances are defined in the Article 57-2 of the Act, and the silicon carbide is listed by No.336 in Appended Table9 in the Article 18-2 of the Enforcement Order as “Dangerous or Harmful Substances to be notified their names, etc.”

16. Other Information

16.1 Other hazard and toxicity information

The following cautions are required about the dust which occur from Ceramic producing process.

- Dust can cause irritation of the nose, mouth, throat, eye mucosa, upper respiratory tract and lungs when inhaled.Symptoms of overexposure include allergic dermatitis, productive cough, wheezing, shortness of breath, and chest tightness, etc.
- Ingestion of the dust containing high levels of cobalt may cause damage of the blood, heart, thyroid gland and spleen. (References: 1)
- Ingestion of the dust containing high levels of aluminium oxide may cause irritation of the eyes and upper airway (References: 2)
- Repeated or long-term inhalation or exposure of aluminum oxide may affect central nerve system. (References: 2)
- Zirconium oxide may cause dizziness, the increase in perspiration and the deterioration of capillary tube resistance and the hyperfunction of sensation for pain and temperature, the granuloma of the skin, light irritative symptom of respiratory organs. (References: 3)
- Repeated or long-term skin contact with zirconium oxide may cause irritation and skin rash. (References: 3)
- Recent studies indicate that the repeated inhalation or long term contact of cobalt or nickel or chromium metal may affect the skin, respiratory organs, heart, etc. (References: from 2 to 5)

Although there is no carcinogenic knowledge about Ceramic, there is the following knowledge about a raw powder, and composition metal component.

•Metallic Cobalt

ACGIH	Group A3 : carcinogenic in animals, but the relevance to humans is unknown
IARC	Group 2B : possibly carcinogenic to humans
JSOH	Group 2B : possibly carcinogenic to humans (the substance whose evidence is not comparatively enough)

•Metallic Nickel

ACGIH	Group A5 : not suspected as a human carcinogen
IARC	Group 2B : possibly carcinogenic to humans
JSOH	Group 2B : possibly carcinogenic to humans (the substance whose evidence is not comparatively enough)

•Metallic chromium

IARC	Group 3 : not classifiable as to its carsinogenisity to humans
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*ACGIH: American Conference of Governmental Industrial Hygienists Inc.

*IARC: International Agency for Research on Cancer

* JSOH: Japan Society for Occupational Health

Although there is no knowledge of environmental impact about a Ceramic, there is the following knowledge about composition metal component.

Cobalt and chromium may be potentially hazardous to the environment. Particular attention is required regarding the effect to the aquatic organism.

16.2 Notes on the following descriptions

The details in this SDS have been based on our best investigation and evidences.

The information may be revised according to new evidences, test etc., however, the accuracy and safety of the information are not a guaranteed value.

All chemical agents may contain unknown harmful substances: therefore, the companies and operators, using this SDS, are requested to take appropriate actions according to their own conditions on their own responsibility.

- * Homepage of Ministry of Economy, Trade & Industry : <http://www.meti.go.jp/>
- * Homepage of Ministry of Environment : <http://www.env.go.jp/>
- * Homepage of Ministry of Health, Labor & Welfare : <http://www.mhlw.go.jp/>
- * IARC (International Agency for Research on Cancer) : <http://monographs.iarc.fr/>
- * Supplier of ICSC Cards : <http://www.nihs.go.jp/ICSC/>
- * National Institute of Technology and Evaluation : <http://www.safe.nite.go.jp/ghs/list.html>

16.3 Literature reference

- 1) Food & Drug Research Laboratories, Study No.8005B (4.11.84).
- 2) International Chemical Safety Cards (aluminum, cobalt, nickel).
- 3) Danger and hazardous property handbook of a chemical substance (Japan Industrial Safety & Health Association).
- 4) T. Shirakawa et al., Chest.95.29 (1989).
- 5) A.O.Bech et al., Brit.J.Ind.,19,239 (1962).