

SAFETY DATA SHEET

PRODUCT NAME: CERAMIC (Silicon Nitride base)

1. Identification of the Substance and of the Company

1-1. Product Identifier :

Ceramics and Ceramic tools (Silicon Nitride base)

1-2. Company Information

Manufacturer : Kyocera Corporation

Address : 6 Takeda Tobadono-Cho, Fushimi-Ku Kyoto 612-8501

Division : Corporate Cutting Tool Group

Phone No. : +81-75-604-3651 FAX No. : +81-75-604-3472

Emergency Contact : Sendai Quality Assurance Section (Sendai Plant) Phone No. : +81-996-23-4116

1-3. Recommended use and Restriction on use :

Cutting tools for mainly metal materials, wear-resistant tools for deformation processing, special cutters and knives.

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. The GHS classification

Some data (such as the burning rate test data, etc.) for the dust, fume or vapor which occur from Ceramic producing process are unavailable. Therefore, they are not be classified by GHS.

2-2. GHS label element

Not applicable

3. Composition/Information on Ingredients

- Ceramic may be coated with the following materials:
TiN, TiC, Ti(C, N), (Ti, Al)N, Al₂O₃
- Distinction between substance and mixture : Mixture (Ceramic: Silicon Nitride base)
- Ingredients and concentration or concentration range (composition) of Ceramic

Ingredient	Chemical Formula	CAS#	Official Number of Law for PRTR*	Industrial Safety and Health Law(Official Number)	Composition mass%
Silicon Nitride	Si ₃ N ₄	12033-89-5	N/A	N/A	50--95
Titanium Nitride	TiN	N/A	N/A	N/A	0--40
Aluminum Oxide	Al ₂ O ₃	1344-28-1	N/A	Appendix 9-189	0--30
Aluminum Nitride	AlN	24304-00-5	N/A	N/A	0--10
Yttrium Oxide	Y ₂ O ₃	1314-36-9	N/A	Appendix 9-54	0--10

*Law for PRTR: Law concerning Reporting, etc. of Releases to the Environment of Specific Chemical Substances and Promoting Improvements in Their Management

4. First-Aid Measures

Inhalation:

- If the high concentration of dust is inhaled or respiratory symptoms (coughs, gasping, shortness of breath, etc.) are experienced, move to fresh air and take a rest with posture easy to breathe. If breathing difficulties occur, administer oxygen inhalation. If breathing has stopped, immediately administer artificial respiration and get medical advice/attention.
- If irritation or rash persists, get medical advice and attention.

Skin Contact:

- If dust is contacted with skin, take off contaminated clothing and rinse the affected area with soapy water thoroughly.
- If irritation or rash persists, get medical advice/attention.

Eye Contact:

- If dust is in eyes, immediately wash away with clean water (remove the contact lenses if possible).
- If irritation persists, get medical advice/attention.

Ingestion:

- If a large amount of dust is swallowed, get medical advice/attention after ingesting plenty of water to dilute.

5. Fire-Fighting Measures

Extinguishing Media

- To extinguish the fire of dust, use dry sand, expanded vermiculite, dilatable perlite, ABC type (general, oil, electric fire) powder extinguishers or water (no water allowed for the dust containing cut powders of light metal such as magnesium and aluminum).

Special Protective Actions for Fire-Fighters

- In fighting a fire, wear a protective clothing, dust-proof respirator or respiratory protective equipment.

6. Accidental Release Measures

Personal Precautions

- It is recommended that someone who cleans dust should wear clothing and respiratory protective equipment to minimize exposure.

Environmental Precautions

- Dispose of dust as industrial wastes and prevent release in water systems.

Containment and Cleanup Methods and Equipment

- If there is dust which occur from Ceramic producing process, isolate the area and remove with a cleaner equipped with a filter which can take up fine particles very efficiently. If appropriate removing methods are not available, sweep with water sprayers or wet mops.

7. Handling and Storage

Handling

- Ceramics are a stable material and are not considered to be a physical or health hazard. However, there is the possibility of causing skin problems when contacting the dust or grinding fluid containing ceramics for long hours or repeatedly.
- When grinding or machining this product, minimize the exposure of the dust and sludge by local exhaust ventilation and other protective devices.
- Wash hands thoroughly after handling, before eating or smoking. Do not eat, drink and smoke at the handling area.
- Periodic medical examination is recommended for individuals regularly exposed to dust or mist.

Storage

- Avoid sudden changes of temperature and high humidity for storage.

8. Exposure Controls/Personal Protection

Exposure Prevention

- Permissible concentration in working environment (reference value)

Ingredient	Chemical Formula	OSHA*PEL* mg/m ³ (Metal dust concentration)	ACGIH*TLV* mg/m ³ (Metal dust concentration)	JSOH*OEL* mg/m ³ (Respirable dust conc.)
Silicon nitride	Si ₃ N ₄	N/A	N/A	N/A
Titanium Nitride	TiN	N/A	N/A	N/A
Aluminum oxide	Al ₂ O ₃	5(as Al)	10	N/A
Aluminum Nitride	AlN	5 (as Al)	1 (as Al)	N/A
Yttrium Oxide	Y ₂ O ₃	1 (as Y)	1 (as Y)	N/A

* OSHA: Occupational Safety & Health Administration U.S. Department of Labor

* PEL: Permissible Exposure Limit

* ACGIH: American Conference of Governmental Industrial Hygienists Inc.

* TLV: Threshold Limit Value

* JSOH: Japan Society for Occupational Health

* OEL: Occupational Exposure Limit

* N/A: Not Applicable

Protection Measures

- Respiratory Protection: Dust-proof respirators and respiratory protective equipment are recommended.
- Hand Protection: Protective gloves for dust are recommended.
- Eye Protection: Protective glasses for dust are recommended.
- Skin/Body Protection: Avoid direct skin contact.
Clean up deposited dust on clothing, rags, etc. by washing or absorbing with suitable filters but not by whisking off. Change the contaminated clothing into clean one.

Hygiene Measure

Wash skin thoroughly after handling.

9. Physical and Chemical Properties

Appearance:	Gray color (In case of the coated Ceramic, the appearance color is often different.)
Odor:	Odorless
pH:	No data available
Melting Point:	No data available
Boiling Point:	No data available
Flash Point:	No data available
Vapor Pressure:	No data available
Specific Gravity:	3.0 – 4.0
Solubility:	Insoluble

10. Stability and Reactivity

A grain of dust which occur from Ceramic producing process is very fine and under the specific conditions in which the dusts are mixed with grinding oil with low flash point, it is possible to become pyrophoric. If dusts under very flammable conditions are dispersed in the air, it is possible to explode.

Reactivity: It dissolves in an acid and an alkali in very small quantities.

Chemical stability: The product concerned is in a solid state, and there are not explosiveness, inflammability, combustibility, spontaneous combustibility, water-reactivity, and an oxidation nature, and it is chemically stable under the usual environment.

Possibility of hazardous reactions: None

Conditions to avoid: Contact with the following incompatible materials.

Incompatible Materials: Oxidizing substances (Strong oxidants, Strong acids, etc.)
Others (Strong base, etc.)

Hazardous decomposition products: None

11. Toxicological Information

Acute Toxicity:	No data available on Ceramic
Skin Corrosion/Irritation:	No data available on Ceramic
Serious Eye Damage/Eye Irritation:	No data available on Ceramic
Respiratory or Skin Sensitization:	No data available on Ceramic
Germ Cell Mutagenicity:	No data available on Ceramic
Carcinogenicity:	No data available on Ceramic
Reproductive Toxicity:	No data available on Ceramic
Specific Target Organ Toxicity/Systemic Toxicity: (Single Exposure)	No data available on Ceramic
Specific Target Organ Toxicity/Systemic Toxicity: (Repeated Exposure)	No data available on Ceramic
Aspiration Hazard:	No data available on Ceramic

12. Ecological Information

- The aquatic environment acute hazard
- Not reported on Ceramic
- The aquatic environment chronic hazard
- Not reported on Ceramic
- Mobility
- Not reported on Ceramic

13. Disposal Considerations

Safe and environmentally desirable disposal method

- For disposal, conform to the applicable laws regarding industrial wastes such as 'Waste Disposal and Public Cleansing Law' and relevant local by laws.

14. Transport Information

International Regulations

United Nations Number:	Not applicable
United Nations Hazard Class:	Not applicable
Marine Pollutant:	Not applicable

Domestic Regulations

Land Regulatory Information	Not applicable
United Nations Number	Not applicable
United Nations Hazard Classification	Not applicable
Marine Pollutant:	Not applicable

Special Safety Measures

When transporting the dust which occur from Ceramic producing process, make sure that there is no damage or corrosion or leakage of the container, to ensure implementation of the prevention of collapse of cargo.

15. Regulatory Information

- **Industrial Safety and Health Law, Ordinance on Prevention of Hazards due to Specified Chemical Substances**
Aluminum oxide : The substances are defined in the the Article 57-2 of the Act, and the Aluminum oxide is listed by No.189 in Appended Table 9 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 yttrium 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."

In other region, follow the local regulations.

16. Other Information

Other hazardous Information

When grinding this product, regarding dust or fumes to generate, the following cautions are required.

Dust or fumes from grinding this product 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 aluminum oxide may cause irritation of the eyes and upper airway
(References: 1)

Repeated or long-term inhalation or exposure of aluminum oxide may affect central nerve system. (References: 1)

Disclaimer

Although Kyocera has attempted to provide current and accurate information herein, Kyocera makes no representations regarding the accuracy or completeness of the information and assumes no liability for any loss, damage, or injury of any kind which may result from or arise out of the use of or reliance on the information by any person.

Numerical values, such as content, physics/chemical property, are not guaranteed values.

Reference URI

- Ministry of Economy, Trade and Industry : <http://www.meti.go.jp/>
- Ministry of the Environment : <http://www.env.go.jp/>
- Ministry of Health, Labour and Welfare : <http://www.mhlw.go.jp/>
- Japan Industrial Safety and Health Assoc. : <http://www.jaish.gr.jp/>
- International Agency for Research on Cancer : <http://monographs.iarc.fr/>
- International Chemical Safety Card : <http://www.nihs.go.jp/ICSC/>
- National Institute of Technology and Evaluation: <http://www.safe.nite.go.jp/ghs/list.html>

References Documents

(1) International Chemical Safety Cards (aluminium oxide).

(2) Danger and hazardous property handbook of a chemical substance (Japan Industrial Safety & Health Association).