

Safety Data Sheet

Version: 2.1

Revision Date: 03/27/2024

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product Name: Aluminum nitride (Sintered Ceramic Parts)

CAS No.: [24304-00-5]

Molecular Weight: 40.99

Chemical Formula: AlN

Product Codes: ST-100, ST-170, ST-200, STL-150D

1.2 Relevant identified uses

Identified uses: Ceramic insulators, transistor packaging, collector rods, rf/microwave windows, infrared-permeable windows, missile nosecones, ceramic body-armor.

1.3 Details of Supplier Company

Company: Sienna Technologies, Incorporated
11611 49th Place W,
Mukilteo, WA 98275

Telephone: (425) 485-7272

1.4 Emergency telephone number

Emergency telephone: (425) 485-7272

2. HAZARD(S) IDENTIFICATION

2.1 Classification of the material

When used as intended, this product is an article (as defined in OSHA 29 CFR 1910.1200(c)) and should not pose any health hazard. This material is not considered hazardous by the OSHA Hazard Communication Standard, OSHA 29 CFR 1910.1200.

Physical hazards: Not classified.

Health hazards: Not classified.

Environmental hazards: Not classified.

Authority defined hazards: Not classified.

2.2 GHS Label elements

Pictogram: None.

Signal word: None.

Hazard statements: None.

Precautionary statements: Observe good industrial hygiene practices.
Wash hands after handling.
Store away from incompatible materials.
Dispose of waste and residues in accordance with local authority requirements.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

None known.

2.4 Supplemental Information

The current information applies only to the material in sintered, consolidated parts, and not to a powder form. Fired aluminum nitride ceramic is inert and has no known hazard. However, when reverted to airborne particulate forms, such as in grinding or cutting operations, airborne materials which may result may cause respiratory tract irritation.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixtures

Chemical Name	Common Name	Formula	CAS No	Percent
Aluminum nitride		AlN	24304-00-5	>80%
Proprietary Additive (non hazardous)				0-10%
Aluminum oxide	Alumina	Al ₂ O ₃	1344-28-1	0-5%
Oxides of rare earth metals, oxides of alkaline earth metals	Misc.	Misc.		<5%

4. FIRST AID MEASURES

4.1 Description of first aid measures

Inhalation

If dust from processing is inhaled, remove to fresh air. If breathing is difficult, provide oxygen. Loosen any tight clothing on neck or chest. Provide cardiopulmonary resuscitation for persons without pulse or respirations. Consult a physician.

Ingestion

If large amounts were swallowed, give water to drink and get medical advice.

Skin Contact

In case of skin irritation, immediately wash skin with plenty of soap and water for at least 15 minutes. If irritation persists, seek medical attention.

Eye Contact

If dust from processing gets in the eyes, immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

4.2 Most important symptoms and effects, both acute and delayed

Dust from processing: Irritating to eyes, respiratory system and skin.

4.3 Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

5. FIRE FIGHTING MEASURES

5.1 Suitable extinguishing media

Use any extinguishing media appropriate for surrounding fire.

5.2 Specific hazards

Not expected to be a fire hazard. This is not a combustible material. No explosion hazard identified. If aluminum nitride part is heated in a fire and then contacted by hot water, ammonia gas may evolve. Ammonia is a respiratory and mucous membrane irritant.

5.3 Information for firefighters

In the event of any fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full face piece operated in the pressure demand or other positive pressure mode.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment, and emergency procedures

Wear personal protective equipment as described in section 8. Avoid formation and inhalation of dust.

6.2 Methods and materials for containment and cleaning up

Clean up spills immediately, observing precautions in the Protective Equipment Section 8. Sweep up with a dry wipe, then place into a suitable container for disposal. Avoid generating dusty conditions. Provide adequate ventilation.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid generating dust. Use with adequate ventilation. Use personal protection recommended in Section 8.

7.2 Conditions for safe storage, including any incompatibilities

Keep containers tightly closed and store in a dry area. Suitable for any general chemical storage area.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Occupational exposure limits

At present there are no established OSHA PELs or ACGIH TLVs for aluminum nitride. Values listed below for aluminum nitride refer to total respirable inert dusts of particulates not otherwise classified.

U.S. – OSHA

Components	CAS	Type	Value	Form
Aluminum nitride	24304-00-5	TWA	15 mg/m ³	Total dust
Aluminum oxide	1344-28-1	TWA	5 mg/m ³	Respirable fraction

ACGIH

Components	CAS	Type	Value	Form
Aluminum nitride	24304-00-5	TLV	10 mg/m ³	Total dust
Aluminum oxide	1344-28-1	TWA	1 mg/m ³	Respirable fraction, as Al

8.2 Airborne Exposure Limits:

Same as those for nuisance dust (ACGIH TLV/TWA 1998):

Particulates not otherwise classified: 10 mg/m³, Respirable dust 3 mg/m³.

More restrictive limits are based on the soluble aluminum content of soluble compounds.

For soluble aluminum compounds, a TLV (1998) of 2 mg Al/m³ has been established

based on concern for respiratory tract irritation. For AlN powder, which hydrolyzes in presence of moisture, a maximum concentration in workroom air of 4 mg/m³ is recommended (Braknova, 1986). No OSHA PELs are listed for AlN.

8.3 Ventilation System:

As long as the parts are not machined by drilling, sawing, grinding, polishing, no special ventilation system is required.

8.4 Personal Respirators (NIOSH Approved):

As long as the parts are not machined by drilling, sawing, grinding, polishing, no respirators are required. For emergencies, or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator.

8.5 Skin Protection:

Wear protective gloves and clean body-covering clothing.

8.6 Eye Protection:

Only where dusting or splashing of solutions is possible, use safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 and/or full face shield.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Tan or Gray
Odor:	No odor (the powder generated during wet grinding may have a slight ammonia odor if hydrolyzed)
Water Solubility:	Insoluble in water (< 0.01%)
Density:	3.26 g/cm ³
pH:	No information found.
% Volatiles by volume @ 21°C (70°F):	0
Boiling Point:	unknown
Melting Point:	Decomposes at 2400°C (4352°F)
Vapor Density (Air=1):	Not applicable.
Vapor Pressure (mm Hg):	Not applicable.
Evaporation Rate (BuAc=1):	Nonvolatile.

10. STABILITY AND REACTIVITY

Stability: Stable under ordinary conditions of use and storage. When hydrolyzed with hot water in powder form, some ammonia evolution may occur. AlN oxidizes in oxygen above 1200°C (1470 K).

Hazardous Decomposition Products:	None.
Hazardous Hydrolysis Products:	Ammonia.
Hazardous Polymerization:	Will not occur.
Incompatibilities:	None known. Strong bases etch the surface.
Conditions to Avoid:	No other known hazards.

11. TOXICOLOGICAL INFORMATION

CAS# 24304-00-5: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.

Epidemiology: No information available.

Teratogenicity: No information available.

Reproductive Effects: No information available.

Neurotoxicity: No information available.

Mutagenicity: No information available.

12. ECOLOGICAL INFORMATION

Environmental Fate: No information found.

Environmental Toxicity: No information found.

13. DISPOSAL CONSIDERATIONS

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. TRANSPORT INFORMATION

Not regulated.

15. REGULATORY INFORMATION

15.1 Chemical Inventory Status - Part 1

Ingredient	TSCA Listed?
Aluminum nitride 24304-00-5	Yes
Former CAS Numbers: 1302-38-1; 11132-80-2; 12252-59-4; 37342-40-8; 165390-88-5	EPA Flag: XU

15.2 Federal, State & International Regulations - Part 1

Ingredient	SARA 302		SARA 313	
	RQ	TPQ	List	Chemical Catg.
Aluminum nitride (CAS# 24304-00-5)	No	No	No	No

15.3 Federal, State & International Regulations - Part 2

Ingredient	CERCLA	RCRA	TSCA
		261.33	8(d) 12(b)
Aluminum nitride (CAS# 24304-00-5)	No	No	No No

Chemical Weapons Convention: Not subjected to any chemical weapons conventions.
SARA 311/312: Acute: No Chronic: Unknown

15.4 Clean Air Act: This material does not contain any hazardous air pollutants. This material does not contain any Class 1 or Class 2 Ozone depletors.

15.5 Clean Water Act: None of the chemicals in this product are listed as Hazardous Substances under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

15.6 OSHA: None of the chemicals in this product are considered highly hazardous by OSHA.

16. OTHER INFORMATION

- 16.1 Label Hazard Warning:** As part of good industrial and personal hygiene and safety procedure and as part of good housekeeping, avoid all unnecessary exposure to the chemical substance and ensure prompt removal from skin, eyes and clothing.
- 16.2 Label Precautions:** During use avoid contact with eyes, skin, clothing. Wash thoroughly after handling. When not in use keep in tightly closed container.
- 16.3 Date of last revision:** Version 2.0, 2/3/2017

References

Boshitskaya, N. V., et al.: **Reaction of aluminum nitride powder with biochemical media.** Powder Metallurgy and Metal Ceramics (Translation of Poroshkovaya Metallurgiya (Kiev)) **39**:(3-4), 157-162 (2000)
Lavrenko, V. A.: **Reaction of composite ceramic materials with corrosionally active media.** Powder Metallurgy and Metal Ceramics (Translation of Poroshkovaya Metallurgiya (Kiev)), **39**:(7-8), 369-380 (2001).
Brakhnova, I. T.: **Hygienic evaluation of labor conditions and powders toxicity in production of nitrides of transition metals (in Russian)** Poroshkovaya Metallurgiya (Kiev) **1993**:(11-12), 97-100 (1993). CA **121**, 116519
Krivda, G. I., and B. P. Makeeva:

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