



MATERIAL SAFETY DATA SHEET

ALUMINUM OXIDE - SILICON CARBIDE WHISKER SOLID CERAMICS

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I. GENERAL

Trade Names: ARtuff[®] Ceramic Parts: All Designations
Silar[®] Ceramic Cutting Tool Parts: All Designations
Silar[®] Microwave Absorbent Ceramic Parts: All Designations

Other Name: Aluminum Oxide - Silicon Carbide Whisker Solid Ceramics

Generic Name: Silicon Carbide Whisker-Reinforced Ceramics

Chemical Family: Metal Carbide/Metal Oxide

CAS No.: See Section II

DOT Hazardous Material Proper Shipping Name: Not regulated **DOT Hazard Class:** Not regulated

UN/NA ID No.: N/AP

NFPA Rating: Health 1 Flammability 0 Reactivity 0

II. HAZARDOUS INGREDIENTS

<u>NAME</u>	<u>CAS #</u>	<u>%</u>	<u>CARCINOGEN^b</u>	<u>EXPOSURE LIMIT</u>
Aluminum Oxide	1344-28-1	50-99%	N/P	OSHA PEL : 15 mg/m ³ TWA respirable: 5 mg/m ³ TWA ACGIH [®] TLV [®] : 10 mg/m ³ TWA
Silicon Carbide Whiskers	None ^a	1-50%	2,3	OSHA PEL: Not Listed ACGIH [®] TLV [®] : 0.1 fibers/cc TWA, respirable fibers ^c OTHER: None

a. No CAS # is assigned to silicon carbide whiskers. The CAS # for silicon carbide particulate is 409-21-2.

b. Listing Agencies: 1 = NTP, National Toxicology Program
2 = IARC, International Agency for Research on Cancer
3 = ACGIH[®], American Conference of Governmental Industrial Hygienists
4 = OSHA, Occupational Safety and Health Administration
5 = Other

c. 0.1 fibers/cc 8-hour time weighted average (TWA); fibers greater than 5 micrometers in length, with an aspect ratio greater than or equal to 3:1 as determined by the membrane filter method at 400 to 450 times magnification (4-mm objective), using phase-contrast illumination.

II. HAZARDOUS INGREDIENTS - Continued

Silicon carbide whiskers are a fibrous form of single-crystal silicon carbide having an aspect ratio of 3:1 or greater. Hazardous whiskers are those in the respirable size range. Silicon carbide whiskers are not classified by OSHA or NTP as a carcinogen. IARC classifies the family of ceramic fibers, which includes Silicon Carbide Whiskers, as group 2B: possibly carcinogenic to humans (group 2B: "There is sufficient evidence for the carcinogenicity of ceramic fibers in experimental animals; no data were available on the carcinogenicity of ceramic fibers to humans"). ACGIH® has classified fibrous forms of silicon carbide as A2: Suspected Human Carcinogen in "Silicon Carbide: TLV® Chemical Substances 7th Edition Documentation, ACGIH® Publication #7 DOC-530, 2003." ("The carcinogen designation of A2, Suspected Human Carcinogen, is recommended for fibrous forms, based on inhalation experiments in several species showing lung and pleural carcinogenicity, and limited human data for lung cancer...").

III. PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point: N/AP**Specific Gravity (Water = 1):** 3.30 – 3.97**Vapor Pressure (mm Hg):** N/AP**Melting Point:** Decomposes above 2500°C**Vapor Density (Air = 1):** N/AP**pH:** N/AP**Solubility in Water:** Insoluble**Evaporation Rate (Butyl Acetate = 1):** N/AP**Appearance and Odor:** Variable, typically gray-green solid parts with no odor.

IV. FIRE AND EXPLOSION HAZARD DATA

NOTE: This section is applicable for fire and explosion hazards only and is not to be used for occupational exposures.

Flash Point (Method): Non-flammable by conventional test methods.**Auto Ignition Temp. (Method):** N/AP**Flammable Limits:** Non-flammable**Lower (LEL):** N/AP**Upper (UEL):** N/AP

Fire and Explosion Hazards: Will not support combustion. Can be hazardous under fire conditions if, as a result of contact with water (or other media), causes steam explosions, spreading other combustibles and widening the fire area.

Extinguishing Media: Use extinguishing media appropriate for surrounding materials.

Special Firefighting Procedures: Wear pressure-demand, self-contained breathing apparatus and full firefighting protective clothing.

V. REACTIVITY DATA

Stability: Stable.**Conditions to Avoid:** None.**Incompatibility (Materials to Avoid):** None.**Hazardous Polymerization:** Will not occur.**Conditions to Avoid:** N/AP

VI. HEALTH HAZARDS

There are no known health hazards of the solid ceramic article as supplied. However, as indicated by conditions of use, employ mechanical guards, protective clothing and/or safety glasses to prevent burns or other injury to the body and eyes from hot parts, flying particles, chips or debris. For additional information, see Section VII, Precautions for Safe Handling and Use, and Section VIII, Special Precautions for Processing Solid Ceramics.

VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material is Released or Spilled: Not applicable to the solid ceramic article as supplied.

Waste Disposal Method: Landfill in accordance with all applicable solid waste regulations.

Precautions to be Taken in Handling and Storing: Not applicable to the solid ceramic article as supplied.

Other Precautions: None under normal use. For additional information, see Section VIII, Special Precautions for Processing Solid Ceramics.

VIII. SPECIAL PRECAUTIONS FOR PROCESSING SOLID CERAMICS

Processing the solid ceramic article by operations such as grinding, finishing, polishing, machining, or other operation may create dust containing respirable silicon carbide whiskers, which may produce an inhalation hazard if airborne. Silicon carbide whiskers are classified as possibly carcinogenic to humans by IARC and as a Suspected Human Carcinogen by ACGIH® (see Section II, Hazardous Ingredients). Precautions must be taken to ensure that worker exposure to silicon carbide whiskers does not exceed the exposure limits identified in Section II. Such precautions may include engineering controls to minimize or eliminate airborne whiskers, and use of personal protective equipment to prevent whisker inhalation. For additional information regarding the health hazards of respirable silicon carbide whiskers, refer to ACM's MSDS for Silicon Carbide Whiskers.

IX. CONTROL MEASURES

Respiratory Protection: None under normal use. If airborne concentrations exceed the recommended limits of Section II, Hazardous Ingredients, a suitable respirator should be worn in accordance with OSHA's Respiratory Protection Standard (29 CFR §1910).

Eye Protection: Use protective equipment appropriate for mechanical hazards associated with machining or using the solid ceramic article.

Skin Protection: Not normally considered a skin hazard. If skin contact with dust or particulate occurs, practice good personal hygiene, and wash hands and other exposed areas with mild soap and water before eating, drinking, smoking, using toilet facilities, or leaving work.

Engineering Controls: If handling results in dust, mist or aerosols, special ventilation may be required. Engineering control of airborne materials should be instituted to reduce airborne concentrations to below the exposure limits identified in Section II, Hazardous Ingredients.

--- NOTE --- QUALIFICATIONS	EQ = Equal	AP = Approximately	N/P = No Applicable Information Found
	LT = Less Than	UK = Unknown	N/AP = Not Applicable
	GT = Greater Than	TR = Trace	N/DA = No Data Available

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