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## MATERIAL SAFETY DATA SHEET

SECTION 1 COMPANY AND PRODUCT INFORMATION PAGE 1 OF 5

**Company Name:** Sandvik Coromant Company  
1702 Nevins Road  
Fair Lawn, NJ 07410

**Product Name:** Sandvik Coromant ceramic composite grades: CC620, CC670, CC650/6050, CC680/6080, CC690/6090, GC1690, CC6060, CC6065, CC6190

**Product Descriptions:** Ceramic composites or refractory metal carbide uncoated or coated with any of the following: Aluminum Chromium (Al, Cr), Aluminum Nitride (AlN), Aluminum Oxide (Al<sub>2</sub>O<sub>3</sub>), Aluminum Titanium Nitride (AlTiN), Boron Carbide (B<sub>4</sub>C), Chromium Carbide (CrC), Chromium Nitride (CrN), Diamond Film, Molybdenum Carbide (MoC), Molybdenum Disulfide (MoS<sub>2</sub>), Niobium Carbide (NbC), Tantalum Carbide (TaC), Titanium Aluminum Nitride (TiAlN), Titanium Boride Carbonitride (TiBCN), Titanium Carbide (TiC), Titanium Carbo Nitride (TiCN), Titanium Diboride (TiB<sub>2</sub>), Titanium Nitride (TiN), Titanium Zirconium Nitride (TiZrN), Tungsten carbide/Carbon (WC/W), Vanadium Carbide (Vc), Zirconium Nitride (ZrN).

**Date Prepared:** 11-22-06

**Emergency Telephone:** 201-794-5000

**Non-Emergency Telephone:** 201-794-5000

**Non-Emergency Fax:** 201-794-5165

**NFPA Hazard Rating:** HEALTH 1; FLAMMABILITY 0; REACTIVITY 0.

## SECTION 2 COMPOSITION, INFORMATION ON INGREDIENTS

Composite Ceramic Chemical Name	CAS #	Weight*	OSHA PEL-TWA	ACGIH TLV-TWA
Aluminum nitride	2304-00-5	0 – 15	Not established	Not established
Aluminum oxide (Limit for Al)	001344-28-1	0 – 98	15 mg/m <sup>3</sup> total dust 5 mg/m <sup>3</sup> resp. fraction	10 mg/m <sup>3</sup>
Iron oxide (Limit as Fe <sub>2</sub> O <sub>3</sub> )	1309-37-1	0 – 3	10 mg/m <sup>3</sup> (total)	5 mg/m <sup>3</sup>
Magnesium oxide	1309-48-4	0 – 2	15 mg/m <sup>3</sup>	10 mg/m <sup>3</sup>
Silicon carbide (whiskers)	409-21-2	0 – 40	Not established	0.1f/cc
Silicon carbide (non-whiskers)	409-21-2	0 – 10	15 mg/m <sup>3</sup> total dust 5 mg/m <sup>3</sup> resp. fraction	10 mg/m <sup>3</sup> total dust 3 mg/m <sup>3</sup> resp. fraction
Silicon nitride	7439-98-7	0 – 95	15 mg/m <sup>3</sup> total dust	10 mg/m <sup>3</sup> inh. fraction 3 mg/m <sup>3</sup> resp. fraction
Titanium carbide (Limit as TiO <sub>2</sub> )	12070-08-5	0 – 30	15 mg/m <sup>3</sup> total dust	10 mg/m <sup>3</sup>
Ytterbium	7440-64-4	0 – 2	Not established	Not established
Yttrium oxide (Limits as Y)	1314-36-9	5 – 6	1 mg/m <sup>3</sup>	1 mg/m <sup>3</sup>
Zirconium oxide (Limits as Zr)	131423-4	2 – 6	5 mg/m <sup>3</sup>	5 mg/m <sup>3</sup>

\* Exact Percentages Depend on Grade Specifications

During normal operation and usage, ceramic composite products do not present inhalation, ingestion, or other chemical hazards. However, operations such as grinding, cutting, burning, and welding of such products may release dusts, fumes, or vapors which may present health hazards, if the exposure limits described in Section 2 are exceeded. The health hazards described below relate to these non-routine operations, as well as exposure to component materials.

Wet or dry grinding of ceramic composite products will produce dusts of potentially hazardous ingredients which can be inhaled, swallowed, or come in contact with the skin or eyes. During wet grinding, the dust can be suspended or dissolved in the coolant mist.

**Primary Routes of Entry:** Inhalation, ingestion, skin contact

**Acute Health Effects:**

Dust and fibers from grinding can cause irritation of the nose, throat, lungs, eyes, and mucous membranes. Skin exposure can cause an irritation, redness and swelling.

**Chronic Health Effects:**

Aluminum oxide, magnesium oxide, and zirconium dusts generally act as nuisance dusts having little effects on the lung when exposures are kept under reasonable control. Animal studies indicate that repeated inhalation of yttrium can cause lung fibrosis with scarring and decreased pulmonary capacity. Chronic inhalation of high concentrations of iron oxide may cause benign pneumoconiosis (siderosis) which does not appear to affect the respiratory system. Repeated exposure to respirable silicon carbide whiskers (ceramic fibers) may cause fibrosis of the lung and increase the risks of developing cancer. Studies have indicated that some silicon carbon whiskers have biological effects similar to that of crocidolite. Limited data available indicates that unlike silicon carbide whiskers, silicon carbide powder does not appear to cause lung fibrosis or exert a carcinogenic effect. Although silicon nitride powder is believed to be of much lower toxicity, until further information is available, airborne dusts should be maintained below the quartz PEL of 0.1 mg/m<sup>3</sup> (respirable dust). Magnesium oxide fumes may cause metal fume fever. Symptoms of overexposure include irritation, productive cough, wheezing, shortness of breath and chest tightness.

Skin: Allergic granulomas (tumor-like growths) have occurred from use of skin care products containing zirconium dioxide.

Eye contact with metals and their oxides may result in conjunctivitis. Particles of aluminum deposited in the eyes may cause necrosis of the cornea.

Medical conditions aggravated by exposure: Exposure to dusts may exacerbate pre-existing skin and respiratory disease.

**Carcinogenicity (OSHA , NTP, IARC, ACGIH):**

Respirable ceramic fibers are classified by IARC as possibly carcinogenic to humans (group 2B) and as substances reasonably anticipated to be carcinogenic by NTP. Fibrous silicon carbide (whiskers) is listed by the ACGIH as a suspected human carcinogen (A2). Ceramic fibers are known to the State of California to cause cancer.

## SECTION 4

## FIRST AID MEASURES

**Inhalation:**

If symptoms of pulmonary involvement develop (coughing, wheezing, dyspnea, etc.), remove to fresh air. If symptoms persist, seek medical attention.

**Skin Contact:**

If irritation or rash occurs, thoroughly wash affected area with soap and water and isolate from exposure. If irritation or rash persists, seek medical attention. Care should be taken not to rub fibers into skin.

**Eye Contact:**

Remove contact lenses at once. Flush eyes with large amounts of water. If irritation persists, seek medical attention.

**Ingestion:**

If substantial quantities are swallowed, seek medical attention.

**Flash Point:** Not applicable

**Lower Explosive Limit:** Not applicable

**Upper Explosive Limit:** Not applicable

Ceramic composite products are not a fire hazard under normal conditions of use. However, dusts generated in grinding may be sensitive to static discharge or ignite if allowed to accumulate and then are exposed to an ignition source.

**Extinguishing Media:**

Use a dry powder extinguisher appropriate for use with metal dust fires.

**Special Fire Fighting Procedures:**

Firefighters should wear a NIOSH/MSHA approved full-facepiece self-contained breathing apparatus (SCBA) operated in positive pressure mode and full turnout gear. See Section 3 and 8 for specific hazard identification and exposure control measures.

**Unusual Fire and Explosion Hazards:**

Dusts may present a fire or explosion hazard under rare favoring conditions of particle size, dispersion, concentration, and strong ignition source. However, this is not expected to be a problem under normal handling conditions.

**Hazardous Combustion Products:**

See Section 3 for specific hazard identification.

## SECTION 6

## ACCIDENTAL RELEASE MEASURES

**Steps to be Taken in Case Material is Released or Spilled:**

Clean up area using methods that avoid dust generation such as a high efficiency particulate air (HEPA) vacuum, wet dust mop, or wet clean-up. Use an appropriate National Institute of Occupational Safety and Health (NIOSH)-approved respirator whenever airborne concentrations of hazardous components exceed exposure limits listed in Section 2.

## SECTION 7

## HANDLING AND STORAGE

Under normal operating conditions, the use of ceramic composite products do not require special safety precautions beyond normal safety procedures for handling and using cutting tools, such as safety glasses and gloves. However, operations such as grinding, cutting, burning, and welding of ceramic composite products may generate dusts or fumes which may require special handling procedures. The procedures described below relate to these non-routine operations.

**Hygienic Practices:**

Wash hands thoroughly after handling, and before eating or smoking. Wash exposed skin at the end of the work shift. Smoking and consumption of food or beverages should be restricted from areas where hazardous components may be present. Do not shake clothing, rags, or other items to remove dust. Dust should be removed by laundering or vacuuming (with appropriate filters) the clothing, rags, or other items.

**Precautions to be Taken in Handling and Storage:**

Maintain good housekeeping procedures to prevent dust accumulation during grinding. Avoid dust inhalation and direct skin contact with dust. See Section 3 for specific health hazards.

**Other Precautions:**

Clean up using methods that avoid dust generation such as a HEPA vacuum, wet dust mop, or wet clean-up. Use a NIOSH-approved respirator whenever airborne concentrations of hazardous components exceed exposure limits listed in Section 2. See Section 3 for specific health hazards.

**Note:**

Periodic medical monitoring is recommended for individuals regularly exposed to dust or fumes, with particular attention to any potential sensitization effects of such substances.

**Personal Protection:**

Always wear safety glasses with side shields when grinding or cutting ceramic composite products. Use a NIOSH-approved respirator, with the proper assigned protection factor, whenever airborne concentrations of hazardous components exceed exposure limits listed in Section 2. Protective gloves or barrier cream, and clothing to prevent skin contact with dusts are recommended. See Section 3 for specific health hazards.

**Ventilation:**

Use adequate local (preferably) or general exhaust ventilation to ensure that concentrations of dusts or fumes do not exceed exposure limits.

## SECTION 9

## PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance and Odor:</b>	Green to Dark Gray Solid, Odorless	<b>Specific Gravity (H<sub>2</sub>O=1):</b>	Not applicable
<b>Boiling Point:</b>	Not applicable	<b>Percent Volatile by Volume:</b>	Not applicable
<b>Vapor Pressure (mm Hg):</b>	Not applicable	<b>Evaporation Rate:</b>	Not applicable
<b>Vapor Density (Air=1):</b>	Not applicable	<b>Solubility in Water:</b>	Insoluble

## SECTION 10

## STABILITY AND REACTIVITY

**Stability:** Stable

**Hazardous Decomposition Products:** None

**Conditions to Avoid:** None known

**Hazardous Polymerization:** Will Not Occur

**Incompatibility:** Oxidizers and strong acids. Contact of dust with strong oxidizers may cause fire or explosions.

## SECTION 11

## TOXICOLOGICAL INFORMATION

No information found.

## SECTION 12

## ECOLOGICAL INFORMATION

No information found.

## SECTION 13

## DISPOSAL CONSIDERATIONS

**Waste Disposal Method:**

Dispose of in accordance with appropriate government regulations. May be sold as scrap for reclamation.

DOT Proper Shipping Name:	Not regulated by this mode of transportation
IMO Proper Shipping Name:	Not regulated by this mode of transportation
IATA Proper Shipping Name:	Not regulated by this mode of transportation
AFI Prop. Shipping Name:	Not regulated by this mode of transportation

## SECTION 15

## REGULATORY INFORMATION

OSHA:

This product, under normal conditions of use, is not hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200. However, dust generated while grinding, cutting, burning or welding this product may be hazardous as noted in Sections 2 and 3.

TSCA:

Components of this product are listed on the TSCA inventory.

SARA:

Components of this product may be subject to the requirements of Section 313 of Title III of Superfund Amendment and Reauthorization Act of 1986.

State Regulatory Information:

This product may contain ceramic fibers, which is listed in California Proposition 65 as a known cancer-causing chemical.

## SECTION 16

## OTHER INFORMATION

Users Responsibilities

This Material Safety Data Sheet provides information consistent with recommended applications of these products and anticipated non-routine activities involving the product. It is the user's responsibility to identify and protect against health and safety hazards presented by modification of ceramic composite products after manufacture. Individuals handling ceramic composite products should be informed of all relevant hazards and recommended safety precautions, and should have access to the information contained in this MSDS.

Disclaimer

The information contained herein is based upon data provided by manufacturers and suppliers of raw materials used in the manufacture of ceramic composite products. The information is offered in good faith as accurate and correct, but no representations, guarantees, or warranties of any kind are made as to its accuracy or completeness, suitability for particular applications, hazards connected with the use of the product, or the results to be obtained from the use thereof. User assumes all risk and liability of any use or handling of any material beyond **Sandvik Coromant's** control. Variations in methods, conditions, equipment used to store, handle, or process the material, and hazards connected with the use of the product are solely the responsibility of the user and remain at its sole discretion.

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