

MATERIAL SAFETY DATA SHEET

 **mitsubishi MATERIALS U.S.A. CORPORATION**

November 2003

Chemical Name: Tungsten Carbide with Cobalt
Trade name: All Mitsubishi Carbide Grade and Coated Carbide Grade
Chemical Family: Refractory Metal Carbides
Molecular Weight: N/A

PHYSICAL DATA

Appearance and Odor: Dark Grey Metal/No Odor
Boiling Point: N/A
Vapor Pressure (mmHg): N/A
Vapor Density (air=1): N/A
Solubility in Water: Insoluble
Specific Gravity (H₂O=1): 10.0 to 15.5
Percent Volatile by volume: 0
Evaporation Rate: N/A
How Best Monitored: Air Sample

HAZARDOUS INGREDIENTS

Material	Percent by Weight	OSHA PEL (mg/m ³)	ACGIH TLV (mg/m ³)
Tungsten Carbide (Limits for tungsten dust)	50-99*	5	5
Cobalt	1-30*	0.1	0.02
Tantalum Carbide (Limits for tantalum dust)	0-50*	5	5
Titanium Carbide (Limits for titanium dust)	0-50*	5 mg/m ³ (as Ta)	5 mg/m ³
Chromium Carbide (Limits for chromium dust)	0-5*	1 mg/m ³ (as Cr ³⁺)	0.5 mg/m ³ (as Cr ³⁺)
Chromium (+3)	0-5*	1 mg/m ³	0.5 mg/m ³

* Depends on grade specifications

HEALTH HAZARD DATA

Routes of Exposure: Grinding cemented tungsten carbide product will produce dust of potentially hazardous ingredients which can be inhaled, swallowed, or come in contact with the skin or eyes.

Effects of overexposure Inhalation: Dust from grinding can cause irritation of nose and throat. It also has the potential for causing transient or permanent respiratory disease, including occupational asthma and interstitial fibrosis, in a small percentage of exposed individuals. It is reported that the cobalt dust is the most probable cause of such respiratory diseases. Symptoms include productive cough, wheezing, shortness of breath, a chest tightness and weight loss. Interstitial fibrosis (lung scarring) can lead to permanent disability or death. Certain pulmonary conditions may be aggravated by exposure.

Skin Contact: Can cause an irritation or an allergic skin rash due to cobalt sensitization, Certain skin conditions, such as dry skin, may be aggravated by exposures.

Eye Contact: Can cause irritation.

Ingestion: Reports outside the industry suggest that ingestion of significant amounts of cobalt have the potential for causing blood, heart and other organ problems.

Emergency and First Aid Procedures:
Applicable for dusts or mists.

Inhalation: If symptoms of pulmonary involvement develop (coughing, wheezing, shortness of breath, etc.), remove from exposure and 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.

Eye Contact: If irritation occurs, flush with copious amounts of water. If irritation persists, seek medical attention.

Ingestion: If substantial quantities are swallowed, dilute with a large amount of water, induce vomiting and seek medical attention.

Carcinogenic Assessment :The National Toxicology Program (NTP) and the International Agency for Research on Cancer (IARC) found there was inadequate data for the carcinogenicity of chromium and trivalent chromium compounds. The IARC found that metallic cobalt and metallic nickel are possibly carcinogenic to humans. Cobalt has not been classified as a known or suspected carcinogen by the NTP or Occupational Safety and Health Administration (OSHA). However, for the state of California regulations under Proposition 65 (California Health and Safety Code Section 25249.5 et seq.) this product contains or produces a chemical(s) known to the State of California to cause cancer.

FIRE AND EXPLOSION HAZARD DATA

Flash Point:	N/A
Test Method Used:	---
<u>Flammable Limits:</u>	N/A
LEL:	---
UEL:	---

Hard Cemented Carbide Product is not a fire hazard. Dusts generated in grinding operations may ignite if allowed to accumulate and are subject to an ignition source.

Extinguisher Media: For powder fires, smother with dry dolomite, ABC type fire extinguisher, or flood with water.

Special Fire Fighting Procedures: For a powder fire confined to small area, use a respirator approved for toxic dusts and fumes. For a large fire involving this material, fire fighters should use self-contained breathing apparatus.

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

REACTIVITY DATA

1. Stability: Unstable Stable X
Conditions to avoid: N/A
2. Incompatibility: Contact of dust with strong oxidation may cause fire or explosions.
Materials to avoid: strong acids
3. Hazardous Decomposition Products: None
4. Hazardous Polymerization: May occur Will not occur X
Conditions to avoid: N/A

SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled:

Ventilate area of spill; clean up using methods that avoid dust generation such as vacuum (with appropriate filter to prevent airborne dust levels, which exceed the OSHA PEL or the ACGIH TLV), wet dust mop or wet clean up. If airborne dust is generated, use an appropriate NIOSH approved respirator.

Waste Disposal Method: Disposed of in accordance with appropriate government regulations. May be sold as scrap for reclaim.

SPECIAL PROTECTION INFORMATION

Respiratory Protection: Use an appropriate NIOSH approved respirator if airborne dust concentrations exceed the appropriate OSHA PEL or ACGIH TLV. All appropriate requirements set forth in 29 CFR 1910.134 should be met.

Ventilation: Use local exhaust ventilation, which is adequate to limit personal exposure to airborne dust levels that do not exceed the OSHA PEL or ACGIH TLV. If such equipment is not available use respirators as specified above.

Protective Gloves: Protective Gloves or Barrier Cream are recommended when contact with dust or mist is likely. Prior to applying the Barrier Cream or use of Protective Gloves, wash thoroughly.

Eye Protection: Safety glasses with side shields or goggles are recommended.

Other Protective Equipment: N/A

SPECIAL PRECAUTIONS

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.

Other Precautions: Clean up using methods which avoid dust generation such as vacuum (with appropriate filter to prevent airborne dust levels which exceed the OSHA PEL or the ACGIH TLV), wet dust mop or wet clean-up. If airborne dust is generated, use an appropriate NIOSH approved respirator.

Wash hands thoroughly after handling, before eating or smoking. Wash exposed skin at the end of work shift. Do not shake clothing, rags or other items to remove dust. Dust should be removed by washing or vacuuming (with appropriate filters) the clothing, rags or other items.

Periodic medical examinations are recommended for individuals regularly exposed to dust or mist.

In case of questions, please call:

 **mitsubishi materials U.S.A. CORPORATION**
949-862-5100

MITSUBISHI MATERIALS CORPORATION
TSUKUBA PLANT
1151 FURUMAGI
ISHIGE-MACHI
YUKI-GUN, IBARAKI-PREF
300-2795 JAPAN

MITSUBISHI MATERIALS CORPORATION
GIFU PLANT
GODO-CHO
ANPACHI-GUN
GIFU-PREF
503-2394

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ACGIH. American Conference of Governmental Industrial Hygienists. An organization of professionals in governmental agencies or educational institutions engaged in occupational safety and health programs. ACGIH develops and publishes recommended occupational exposure limits for chemical substances and physical agents (see TLV and BED). (1330 Kemper Meadow, Cincinnati, OH 45240; [513] 742-2020.)

IARC. International Agency for Research on Cancer. One of the three sources that OSHA refers to for data on a material's carcinogenicity. (World Health Organization, Geneva, Switzerland; distributed in the USA from 49 Sheridan Ave., Albany, NY 12210 [518] 436-9686.)

LEL. See Lower Explosive Limit, Lower Flammable Limit.

NIOSH. National Institute of Occupational Safety and Health. The agency of the Public Health Service that tests and certifies respiratory and air-sampling devices. It recommends exposure limits to OSHA for substances, investigates incidents, and researches occupational safety. (NIOSH, 4676 Columbia Parkway, Cincinnati, OH 45226; [513] 533-8328.)

NTP. National Toxicology Program. Federal activity overseen by the Dept. of Health and Human Services with resources from the National Institutes of Health the Food and Drug Administration, and the Centers for Disease Control. Its goals are to develop tests useful for public health regulations of toxic chemicals, to develop toxicological profiles of materials, to foster testing of materials, and to communicate the results for use by others. (NTP Information Office, MD B2-04, Box 12233, Research Triangle Park, NC 27709.)

TLV. Threshold limit value. A term ACGIH uses to express the maximum airborne concentration of a material to which most workers can be exposed during a normal daily and weekly work schedule without adverse effects. "Workers" means healthy individuals; "healthy" is defined as a 150-lb. male, age 25 to 44. The young, old, ill, or naturally susceptible have lower tolerances and need to take additional precautions. ACGIH expresses TLVs in three ways: TLV-TWA, allowable time-weighted average concentration for a normal 8-hour workday or 40-hour week; TLV-STEL, short-term exposure limit or maximum concentration for a continuous exposure period of 15 minutes (with a maximum of four such periods per day, with at least 60 minutes between exposure periods, and provided that the daily TLV-TWA is not exceeded); and Ceiling (C), concentration not to exceed at any time.

TLV-Ceiling Limit. TLV-C. The ceiling exposure limit or concentrations not to exceed at any time even for very brief times. The ACGIH publishes a book annually that explains and lists TLVs called Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. Copies are available from ACGIH (q.v.).

TLV-Skin. See Skin.

OSHA. The Occupational Safety and Health Administration. Part of the U.S. Dept. of Labor. The regulatory and enforcement agency for safety and health in most U.S. industrial sectors. (Documents are available from the OSHA Technical Data Center Docket Office, Rm N-3670, 200 Constitution

Ave., NW, Washington, DC 20210; [202] 219-7500, Web site: www.osha.gov).
OSH Act. The Occupational Safety and Health Act of 1970. Effective April 28, 1971.
Public Law 91-596. Found at 29 CEP 1910, 1915, 1918, 1926. OSHA jurisdiction.
The regulatory vehicle to ensure the safety and health of workers in firms larger than 10 employees. Its goal is to set standards of safety that prevent injury and illness among the workers. Regulating employee exposure and informing employees of the dangers of materials are key factors. This act established the Hazard Communication Rule (29 CFP 1910.1200). See Hazard Communication Rule for details.

OSHA Flammable/Combustible Liquid Classification. (29 CFR 1910.106).
Flammable/combustible liquid is a standard classification used to identify the risks of fire or explosion associated with a liquid. Flammable, or Class I, liquids (flash point below 38 C [100 F]) are divided into: Class IA -- flash point below 22.8 C (73 F), boiling point below 38 C (100 F); Class IB -- flash point below 22.8 C (73 F), boiling point at or above 38 C (100 F); and Class IC -- flash point at or above 22.8 C (73 F), boiling point below 38 C (100 F). Combustible liquids (flash point at or above 38 C [100 F]) are divided into two classes: Class II, flash point at or above 38 C (100 F) and below 60 C (140 F), except any mixture having components with flash points of 93.3 C (200 F) or higher, the volume of which makes up 99% or more of the mixture's total volume; and Class III, flash point at or above 140 F (60 C). Class III liquids are divided into two subclasses: Class IIIA, flash point at or above 60 C (140 F) and below 93.3 C (200 F), except any mixture having components with flash points of 93.3 C (200 F) or higher, the volume of which makes up 99% or more of the mixture's total volume; and Class IIIB, flash point at or above 93.3 C (200 F).

PEL. Permissible Exposure limit. Established by OSHA. This may be expressed as a time-weighted average (TWA) limit, a short-term exposure limit (STEL), or as a ceiling exposure limit. A ceiling limit must never be exceeded instantaneously even if the TWA exposure limit is not violated. OSHA PELs have the force of law. Note that ACGIH TLVs and NIOSH RELs are recommended exposure limits that OSHA may or may not enact into law.