

SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

Product Identifier

RM Number: 1985
RM Name: Thermal Spray Powder – Particle Size Distribution
 Tungsten Carbide/Cobalt (Spheroidal)
Other Means of Identification: Not applicable.

Recommended Use of This Material and Restrictions of Use

This Standard Reference Material (SRM) is intended primarily for use in the calibration of equipment used to measure particle size distributions (PSD) in the 18 μm to 55 μm range. A unit of SRM 1985 consists of a single bottle containing approximately 14 g of tungsten carbide/cobalt powder.

Company Information

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2. HAZARDS IDENTIFICATION

Classification

Physical Hazard: Not classified.
Health Hazard: Respiratory Sensitization Category 1
 Skin Sensitization Category 1
 Carcinogenicity Category 1B

Label Elements

Symbol:



Signal Word: DANGER

Hazard Statement(s):

H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
 H317 May cause an allergic skin reaction.
 H350 May cause cancer.

Precautionary Statement(s):

P201 Obtain special instructions before use.
 P202 Do not handle until all safety precautions have been read and understood.
 P261 Avoid breathing dust.
 P272 Contaminated work clothing must not be allowed out of the workplace.
 P280 Wear protective gloves, protective clothing, and eye protection.
 P284 Wear respiratory protection.
 P304 + P340 If inhaled: If breathing is difficult, remove person to fresh air and keep comfortable for breathing.
 P342 + P311 If experiencing respiratory symptoms: Call a doctor.
 P302 + P352 If on skin: Wash with plenty of water.
 P333 + P313 If skin irritation or rash occurs: Get medical attention.

P363 Wash contaminated clothing before reuse.
P308 + P313 If exposed or concerned: Get medical attention.
P405 Store locked up.
P501 Dispose of contents and container according to local regulations.

Hazards Not Otherwise Classified: Not applicable.

Ingredients(s) with Unknown Acute Toxicity: Not applicable.

3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Substance: sintered tungsten carbide

Other Designations: Tungsten monocarbide; carbide.

Components are listed in compliance with OSHA's 29 CFR 1910.1200; for the actual values see the NIST Certificate of Analysis.

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Tungsten Carbide	12070-12-1	235-123-0	<90
Cobalt	7440-48-4	231-158-0	10

4. FIRST AID MEASURES

Description of First Aid Measures:

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration or oxygen by qualified personnel. Seek immediate medical attention.

Skin Contact: Wash skin with soap and water for at least 15 minutes. If necessary, seek medical attention.

Eye Contact: Flush eyes with water for at least 15 minutes. If necessary, seek medical attention.

Ingestion: If a large amount is swallowed, get medical attention.

Most Important Symptoms/Effects, Acute and Delayed: Coughing, respiratory and skin irritation.

Indication of any immediate medical attention and special treatment needed, if necessary: If any of the above symptoms are present or suspected, seek medical attention if needed.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Negligible fire and explosion hazard in bulk form. Dust/air mixtures may ignite or explode. See Section 9, "Physical and Chemical Properties" for flammability properties.

Extinguishing Media:

Suitable: Regular dry chemical, dry sand, earth, regular foam, and water.

Unsuitable: No information available.

Specific Hazards Arising from the Chemical: None listed.

Special Protective Equipment and Precautions for Fire-Fighters: Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH approved self-contained breathing apparatus (SCBA). Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Use extinguishing agents appropriate for surrounding fire.

NFPA Ratings (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health = 1 Fire = 3 Reactivity = 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures: Any accumulated material on surfaces should be removed and properly disposed of. Keep unnecessary personnel away. Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection".

Methods and Materials for Containment and Clean up: Notify safety personnel of spills. Avoid heat, flames, sparks and other sources of ignition. Do not touch spilled material. Small spills: Collect spilled material in appropriate container for disposal. Move containers away from spill to a safe area. Large spills: Wet down area with water. Dike for later disposal. Remove sources of ignition. Keep unnecessary people away, isolate hazard area and deny entry.

7. HANDLING AND STORAGE

Safe Handling Precautions: Minimize dust generation and accumulation on surfaces. Routine housekeeping should be instituted to ensure that dust does not accumulate on surfaces. Avoid generating dust. See Section 8, "Exposure Controls and Personal Protection".

Storage: Store and handle in accordance with all current regulations and standards. Store in a cool, dry place. Keep separated from incompatible substances.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits:

Component: Tungsten Carbide

No occupational limits established.

Component: Cobalt

NIOSH (REL):	0.05 mg/m ³ (dust and fume, TWA)
	20 mg/m ³ (dust and fume, IDLH)
ACGIH (TLV):	0.02 mg/m ³ [TWA as Co (related to cobalt inorganic compounds)]
OSHA (PEL):	0.1 mg/m ³ (dust and fume, TWA)

Engineering Controls: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Personal Protection: In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

Respiratory Protection: In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

Eye/Face Protection: Splash resistant safety goggles and emergency eyewash are recommended.

Skin and Body Protection: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Chemical resistant clothing and gloves are recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

Descriptive Properties:

Appearance (physical state, color, etc.):

Molecular Formula:

Molar Mass (g/mol):

Odor:

Odor threshold:

pH:

Evaporation rate:

Melting point/freezing point (°C):

Specific gravity (Density):

Vapor Pressure (mmHg):

Vapor Density (air = 1):

Viscosity (cP):

Tungsten Carbide

gray, black, white powder

not applicable

not applicable

odorless

not available

not available

not available

not available

15 g/cc

not available

not available

not available

Descriptive Properties:

Solubility(ies):
Partition coefficient (n-octanol/water):
Particle Size:

Tungsten Carbide

insoluble in water
 not available
 18 µm to 50 µm

Thermal Stability Properties:

Autoignition Temperature (°C):
Thermal Decomposition (°C):
Initial boiling point and boiling range (°C):
Explosive Limits, LEL (Volume %):
Explosive Limits, UEL (Volume %):
Flash Point (°C):
Flammability (solid, gas):

not applicable
 not applicable
 not available
 not available
 not available
 not applicable
 not available

10. STABILITY AND REACTIVITY

Reactivity: Stable at normal temperatures and pressure.

Stability: Stable Unstable

Possible Hazardous Reactions: No data available.

Conditions to Avoid: Avoid generating dust. Avoid heat, flames, sparks and other sources of ignition.

Incompatible Materials: Halogens, oxidizing materials, acids.

Fire/Explosion Information: See Section 5, "Fire Fighting Measures".

Hazardous Decomposition: Oxides of carbon, tungsten compounds, oxides of tungsten.

Hazardous Polymerization: Will Occur Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure: Inhalation Skin Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: Coughing, respiratory effects (pulmonary inflammation).

Potential Health Effects (Acute, Chronic and Delayed):

Inhalation: Inhalation of tungsten carbide can cause irritation. Inhalation of cobalt can result in sensitization. Bronchial asthma has been described in workers exposed to various forms of cobalt. Interstitial lung disease caused by metallic cobalt particles is an occupational lung disease generally referred as hard metal lung disease.

Skin Contact: Exposure to materials containing cobalt may cause irritation, allergic reactions, and skin disorders. Dust may cause mechanical irritation.

Eye Contact: Exposure to dust of cobalt-containing, tungsten carbide may cause inflammation of the conjunctivae.

Ingestion: May cause gastrointestinal irritation. Large doses may cause diarrhea.

Numerical Measures of Toxicity:

Acute Toxicity: Not classified.
 Cobalt Oral Rat LD50: 6171 mg/kg

Skin Corrosion/Irritation: Not classified; no data available.

Serious Eye Damage/Irritation: Not classified; no data available.

Respiratory Sensitization: Category 1.
 This SRM contains >0.1 % of cobalt and it is classified as Category 1.

Skin Sensitization: Category 1.
 This SRM contains >0.1 % of cobalt and it is classified as Category 1.

Germ Cell Mutagenicity: Not classified.

Carcinogenicity: Category 1B.

Listed as a Carcinogen/Potential Carcinogen X Yes No

Cobalt metal with tungsten carbide is listed by IARC as Group 2A (probably carcinogenic to humans).

Cobalt-tungsten carbide powders are listed by NTP as “reasonably anticipated to be human carcinogens”.

Reproductive Toxicity: Not classified; no data available.

Specific Target Organ Toxicity, Single Exposure: Not classified; no data available.

Specific Target Organ Toxicity, Repeated Exposure: No data available.

Aspiration Hazard: Not applicable.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data:

Cobalt: Zebrafish (*Brachydanio rerio*) LC50: > 100 mg/L (96 h; static)

Persistence and Degradability: No data available.

Bioaccumulative Potential: No bioaccumulation expected.

Mobility in Soil: No data available.

Other Adverse effects: No data available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose of waste in accordance with all applicable federal, state, and local regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: Not regulated by DOT or IATA.

15. REGULATORY INFORMATION

U.S. Regulations:

CERCLA Sections 102a/103 (40 CFR 302.4): This SRM is not regulated.

SARA Title III Section 302 (40 CFR 355.30): This SRM is not regulated.

SARA Title III Section 304 (40 CFR 355.40): This SRM is not regulated.

SARA Title III Section 313 (40 CFR 372.65): Cobalt 0.1 % de minimis concentration.

OSHA Process Safety (29 CFR 1910.119): This SRM is not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE HEALTH: No.

CHRONIC HEALTH: Yes.

FIRE: No.

REACTIVE: No.

PRESSURE: No.

State Regulations:

California Proposition 65:

WARNING! This product contains a chemical (cobalt) known to the state of California to cause cancer.

U.S. TSCA Inventory: Tungsten carbide and cobalt are listed.

TSCA 12(b), Export Notification: Not listed.

Canadian Regulations:

WHMIS Information: Not provided for this material.

16. OTHER INFORMATION

Issue Date: 14 October 2020

Sources: ChemADVISOR, Inc., SDS *Tungsten Carbide*, 09 December 2015.
ChemADVISOR, Inc., SDS *Tungsten Carbide Cobalt Mixture*, 20 March 2015.

Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NOEC	No Observed Effect Concentration
ALI	Annual Limit on Intake	NRC	Nuclear Regulatory Commission
CAS	Chemical Abstracts Service	NTP	National Toxicology Program
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	OSHA	Occupational Safety and Health Administration
CFR	Code of Federal Regulations	PEL	Permissible Exposure Limit
DOT	Department of Transportation	PNOR	Particulates Not Otherwise Regulated
EC50	Effective Concentration, 50 %	RCRA	Resource Conservation and Recovery Act
EC10	Effective Concentration, 10 %	REL	Recommended Exposure Limit
EINECS	European Inventory of Existing Commercial Chemical Substances	RM	Reference Material
EPCRA	Emergency Planning and Community Right-to-Know Act	RQ	Reportable Quantity
IARC	International Agency for Research on Cancer	RTECS	Registry of Toxic Effects of Chemical Substances
IATA	International Air Transport Association	SARA	Superfund Amendments and Reauthorization Act
IDLH	Immediately Dangerous to Life and Health	SCBA	Self-Contained Breathing Apparatus
LC50	Lethal Concentration, 50 %	SRM	Standard Reference Material
LD50	Lethal Dose, 50 %	STEL	Short Term Exposure Limit
LEL	Lower Explosive Limit	TLV	Threshold Limit Value
MSDS	Material Safety Data Sheet	TPQ	Threshold Planning Quantity
LOAEC	Lowest Observable Adverse Effect Concentration	TSCA	Toxic Substances Control Act
NFPA	National Fire Protection Association	TWA	Time Weighted Average
NIOSH	National Institute for Occupational Safety and Health	UEL	Upper Explosive Limit
NIST	National Institute of Standards and Technology	WHMIS	Workplace Hazardous Materials Information System

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Users of this SRM should ensure that the SDS in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srmmsds@nist.gov; or via the Internet at <https://www.nist.gov/srm>.