

CRUSHED SINTERED TUNGSTEN CARBIDE

Section 1: Identification

Product Name:	Crushed Sintered Tungsten Carbide	Phone:	909-483-3222
MSDS Issue Date:	June 30, 2015	Fax:	909-483-3233
Synonyms:	No AWS Specification	E-Mail:	sales@rankin.com
CAS Number(s):	See section 3	Web Site:	www.broco-rankin.com
Product Usage:	Hardfacing/Hardbanding		
Manufacturer:	Rankin Industries 400 S. Rockefeller Ave. Ontario, CA 91761 USA		
Transportation Emergency Number:	Emergency Response & Training Solutions 1-800-924-6804 1-440-349-2700 CIN #: 3730		

Section 2: Hazard(s) Identification

The term "hazardous" should be interpreted as a term required and defined in the OSHA Hazard Communications Standard (29 CFR Part 1910.1200) and does not necessarily imply the existence of any hazard. These products as shipped are stable, nonhazardous, nonflammable, nonexplosive and nonreactive.

Hazardous Decomposition Products

Exposure limit: Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedure and electrodes used. Other conditions that also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating, or galvanizing), the number of welders and the volume of work area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities.)

When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section II. Fume and gas decomposition products and not the ingredients in the electrode, are important. The concentration of a given fume or gas component may decrease or increase by many times the original concentration in the powder. Also, new compounds not in the electrode may form. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the material shown in Section II, plus those from the base metal and coating, etc., as noted above.

Reasonably expected fume constituents of these products would include complex oxides of iron, manganese and silicon; secondarily complex oxides of chromium, nickel, molybdenum, titanium, calcium, sodium and potassium.

The present OSHA PEL for hexavalent chromium (CR+6) is 0.05 mg/m³ that will result in a significant reduction from the 5mg/m³ general welding fume (NOC) level. The limit of 0.05 mg/m³ for hexavalent chromium in these electrodes comes from the limit shown in OSHA table Z-2, which is for 0.1 mg of CrO₃ + which calculates to 0.05 mg of Cr+6/m³.

OSH PEL for nickel metal and soluble compounds is 1 mg/m³. The ACGIH TLV for nickel metal is 1 mg/m³ and TLV for soluble compounds is 0.1 mg/m³. These limitations will also result in a significant reduction from the 5 mg/m³ general welding fume (NOC) level.

Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc.

One recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample inside the welder's helmet if worn or in the worker's breathing zone. See ANI/AWS Fl.1 "Method for Sampling Airborne Particles Generated by Welding and Allied Processes" available from the American Welding Society, P.O. Box 351040, Miami, FL 33135.

WARNING: This product may contain or may produce a chemical known to the State of California to cause cancer. (California Health & Safety Code 25249.5 et seq.)

Section 3: Composition / Information on Ingredients

Components of mixture*	CAS Number	Weight percentage**
Tungsten Carbide	12070-12-1	0 – 60
Cobalt	7440-84-4	0 – 20
Tantalum Carbide	12070-06-3	0 – 10
Titanium Carbide	12070-08-5	0 – 10
Vanadium Carbide	12070-10-9	0 – 0.5

IMPORTANT: This section covers the materials from which these products are manufactured. The fumes and gases produced when welding with normal use of these products are covered in Section 11.

Section 4: First Aid Measures

EMERGENCY AND FIRST AID PROCEDURES - Call for medical aid. Employ first aid techniques recommended by the American Red Cross.

Section 5: Firefighting Measures

(Nonflammable) Welding arc and sparks can ignite combustibles and flammables. Refer to American National Standard Z49.1, for fire prevention during the use of welding and allied procedures.

Section 6: Accidental Release Measures

Metal scrap should be picked up using normal procedures, avoiding contact with sharp edges. Metal particulates, shavings, powders and granules should be cleaned up. Use a wet, sweeping action, taking care to avoid creating dust. Vacuum only with HEPA filtered equipment. Do not use compressed air for clean-up. Some fine metal powders may ignite or explode under specific conditions. Trained personnel using pre-planned procedures should respond to uncontrolled releases. Proper protective equipment should be used. In case of a spill, clear the affected area, protect people, and respond with trained personnel. For exposure to particulate levels above regulated levels, use rubber or nitrile gloves, chemically resistant suit and boots, and air purifying respirator with a HEPA filter. Sweep-up the spilled solid and place all spill residues in a double plastic bag and seal.

Section 7: Handling and Storage

- General and/or point ventilation system with dust collection is recommended to ensure exposure to airborne dust is maintained below allowable exposure limits.
- Wear PPE such as work gloves (or vinyl/latex gloves), safety glasses/goggles. Respiratory protection is recommended, but is required only when exposure limits have been exceeded.
- Wash hands after use before eating or smoking.
- Do not eat or smoke in area where material is being used.
- Store in tightly closed container. For best results, keep product above the ambient dew point temperature.
- To prevent rust of wire, make sure a desiccant pack is in with the wire.

Section 8: Exposure Controls / Personal Protection

Exposure Limits:			
Components of mixture	CAS Number	OSHA PEL mg/m ³	ACGIH TLV mg/m ³
Tungsten Carbide	12070-12-1		5 mg/cu.m
Cobalt	7440-84-4	0.1 mg/cu.m	0.1 mg/cu.m
Tantalum Carbide	12070-06-3	5 mg/cu.m	10 mg/cu.m
Titanium Carbide	12070-08-5	15 mg/cu.m	
Vanadium Carbide	12070-10-9		

CLG: Ceiling Limit
STEL: Short Term Exposure Limit

Ventilation – Use enough ventilation, local exhaust at the arc, or both, to keep the fumes and gases below TLV's in the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes.

Respiratory Protection – Use respirable fume respirator or air supplied respirator when welding in confined space or where local exhaust or ventilation does not keep exposure below TLV.

Eye Protection – Wear helmet or use face shield with filter lens. As a rule of thumb, start with a shade that is too dark to see the weld zone. Then go to the next lighter shade which gives sufficient view of the weld zone. Provide protective screens and flash goggles, if necessary, to shield others.

Protective Clothing – Wear head, hand and body protection which help to prevent injury from radiation, sparks, and electrical shock. See ANSI Z49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing. Train the welder not to touch live electrical parts and to insulate himself from work and ground.

Section 9: Physical and Chemical Properties

Physical State	Solid – Dark Grey
Odor	No Odor
Odor Threshold	Not applicable
PH	Not applicable
Melting Point / Freezing Point	Not available
Boiling Point	Not determined
Flash Point	Not determined
Evaporation Rate (butyl acetate = 1)	None
Flammability	Non-flammable
LFL (LEL) lower flammability (explosive) limit	Not applicable
UFL (UEL) upper flammability (explosive) limit	Not applicable
Vapor Pressure	Not applicable
Vapor Density	Not applicable
Specific Gravity (Bulk Density)	Not available
Solubility	Not soluble
Partition Coefficient (n-octanol/water)	Not determined
Autoignition Temperature	Not available
Decomposition Temperature	Not available
% VOC's	0%

Section 10: Stability and Reactivity

- **Chemical Stability:** This material is stable.
- **Possibility of Hazardous Reactions:** Hazardous polymerization will not occur.
- **Conditions to Avoid:** None
- **Incompatible Materials:** Strong acids and/or oxidizers.
- **Hazardous Decomposition Products:** Intense heat may produce carbon monoxide and/or carbon dioxide and oxidizing conditions may produce oxides of the ingredients shown in Section 3. Oxides of these ingredients may be carcinogenic.

Section 11: Toxicological Information

Electric arc welding or oxy fuel welding may create one or more of the following health hazards:

FUMES AND GASES: can be dangerous to your health. COMMON ENTRY IS BY INHALATION.

SHORT TERM (ACUTE): over exposure to welding fumes may result in discomforts such as: dizziness, nausea, dryness or irritation of nose, throat, or eyes.

Chromates present in the fume can cause irritation of the respiratory system, damage to lungs and asthma-like symptoms.

Nickel compounds in the fume can cause metallic taste, nausea, tightness in the chest, fever and allergic reactions.

Fluorides can cause pulmonary edema bronchitis.

LONG TERM (CHRONIC): over exposure to welding fumes can lead to siderosis (iron deposits in the lung) and affect pulmonary function.

Long term over exposure to manganese compounds may affect the central nervous system. Symptoms include muscular weakness and tremors similar to Parkinson's disease. Behavioral changes and changes in handwriting may also appear. Employees exposed to manganese compounds should get quarterly medical examinations for early detection of manganism.

Studies have shown that production workers exposed to hexavalent chromium compounds have an increased incidence of lung cancers. Chromates may cause an ulceration and perforation of the nasal septum. Liver damage and allergic skin rash have been reported. Chromium VI compounds are required by OSHA to be considered carcinogenic.

Long term over exposure to nickel compounds may cause lung fibrosis or pneumoconiosis. Studies of nickel refinery workers indicated a higher incidence of lung and nasal cancers. Nickel and its compounds are considered as carcinogenic as required by OSHA.

Repeated over exposure to fluoride fumes may cause serious bone erosion and excessive calcification of the bones and ligaments of the ribs, pelvis and spinal column. Fluorides may also cause skin rash.

Shielding gases such as argon, helium and carbon dioxide are asphyxiates and adequate ventilation must be provided.

THRESHOLD LIMIT VALUE – The ACGIH 1985-86 recommended limit for welding fumes not otherwise classified (NOC) is 5 mg/m³. TLV-TWA's should be used as a guide in the control of health hazards and not as fine lines between safe and dangerous concentrations. See Section V for specific fume constituents that may modify this TLV-TWA.

ARC RAYS - can injure eyes and burn skin.

HEAT RAYS – (infrared radiation from flame or hot metal) can injure eyes.

ELECTRICAL SHOCK – can kill.

NOISE – can damage hearing.

CARCINOGENICITY – Chromium and nickel and their compounds are on the IARC (International Agency for Research on Cancer) list and the NTP (National Toxicology Program) list as posing a carcinogenic risk to humans.

Section 12: Ecological Information

ENVIRONMENTAL STABILITY: Most of the metals elements are naturally present (in low concentrations) in the soil and water. Individual metal's transport in the environment depends upon the exact compound, the pH, the soil type, and the salinity. All work practices should be aimed at eliminating environmental contamination.

Section 13: Disposal Consideration

Procedure For Cleanup Of Spills Or Leaks – Not applicable.

Waste Disposal Method – Prevent waste from contaminating surrounding environment. Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with federal, state and local regulations.

Section 14: Transport Information

DOT Classification	Not regulated unless greater than 100 lbs. per inner container.
UN Identification Number	Not regulated unless greater than 100 lbs. per inner container.
DOT Shipping Description	Not applicable unless greater than 100 lbs. per inner container.

Section 15: Regulatory Information

Toxic Substances Control Act (TSCA)	All ingredients are listed on the TSCA inventory of chemical substances.
Superfund Amendments & Reauthorization Act (SARA)	This product contains Chromium.
Resource Conservation & Recovery Act (RCRA)	This material is not a hazardous waste. It is Recyclable.
RoHS & REACH	None

Hazard Codifications & Labeling Requirements

H317 – May cause an allergic skin reaction (nickel).

H351 – Suspected of causing cancer (nickel, chromium).

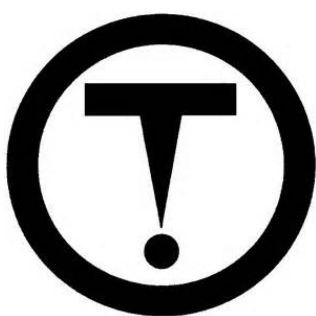
H370 – Target organ (acute), respiratory apparatus, kidney.

H372 – Target organ (chronic), respiratory apparatus.

Section 16: Other Information

NFPA Numbers (estimated)	Health: 1	Flammability: 0	Reactivity: 0
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WHMIS Category: Class D, Division 2A: None of the chemicals in this product are considered highly hazardous by OSHA.



The information supplied herein follows the guidelines of WHMIS, GHS, OSHA Hazard Communication Standard 29 CFR 1910.1200 and California Proposition 65, to the best of our knowledge, is accurate and complete. The recommended hygiene and handling practices are believed to be appropriate for the use of this material. However, it is up to the end user to review this information and establish their own procedures and guidelines, based upon their particular application(s). Rankin Industries assumes no responsibility for damage or injury resulting from the end use of this product.