



SAFETY DATA SHEET

SECTION I – PRODUCT IDENTIFICATION

Product Type: HVOF Powders

Product Name: IA-86/10/4 (Tungsten Carbide Cobalt Chrome), 90/10 (Tungsten Carbide Nickel)
IA-73/20/7 (Tungsten Carbide Chrome Nickel), 88/12 (Tungsten Carbide Cobalt)

Specification: No AWS Specification

Supplier: Indurate Alloys Ltd
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T6E 0A2
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SECTION II – HAZARDOUS INGREDIENTS

Important: This section covers the material from which these products are manufactured. The fumes and gases produced with normal use of these products are covered in Section “V”.

Hazardous Components	Cas No	OSHA PEL mg/m3	ACGIH TLV mg/m3		Weight %
Tungsten	7440-33-7	None	5 10 STEL	0	<65
Carbon	7440-44-8	2.5	2.0		<6
Cobalt	7440-48-4	0.05	0.02	0	<10
Chromium	7440-47-3	1	0.5	Positive	<10

SECTION III - PHYSICAL CHARACTERISTICS

Freeze Point: N/A Degrees F **Odor:** None

Melt Point: N/A Degrees F **Specific Gravity:**

Appearance: Grey Powder **Solubility in H₂O:** None

SECTION IV - FIRE AND REACTIVITY DATA

H.M.I.S Rating: 0

Extinguishing Media: These alloys are non-combustible. Use extinguishing media appropriate to the surrounding fire.

General Reactivity: These alloys are stable materials.

Hazardous Decomposition Products: Various elemental metals and metal oxides may be generated during thermal spraying, welding metallizing or similar operations. Refer to Section II for permissible exposure limits.

Incompatibility: Avoid contact with mineral acids and oxidizing agents which may generate hydrogen gas; the evolution of hydrogen may be an explosion hazard.

Special Fire Fighting Procedures: If this powder is attritioned or reduced in particle size, caution must be used to prevent fire by avoiding sources of ignition, flames, etc. To extinguish a metal powder fire, use dry sand, dry graphite or other class "D" fire extinguishing powder.

Unusual Fire and Explosion Hazards: No unusual fire or explosion hazards are associated with this material.

SECTION V - REACTIVITY DATA

Hazardous Decomposition Products

Exposure limit: Fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being sprayed, the process, procedure and materials used. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal substrate being sprayed (such as paint, plating, or galvanizing), the number of spray systems and the volume of work area, the quality and amount of ventilation, the position of the operators head with respect to the airborne dust, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities).

Reasonably expected fume constituents of these products would include: primarily complex oxides of, tungsten and cobalt: secondary complex of nickel.

The present OSHA PEL for hexavalent chromium (CR₊₆) is 0,05 mg/m³, which will result in a signification reduction from the 5 mg/m³ general, fume (NOC) level. The limit of 0.05 mg/m³ for hexavalent chromium in these materials comes from the limit shown in the OSHA Hazard Communication Standard (29 CFR 1910.1200), which is for 0.1 mg of CrO₃⁺, which calculates to 0.05 mg of CR₊₆/m³. It applies to soluble chromate of the types found in fumes and other chromium containing materials.

The OSHA PEL for nickel metal soluble compounds is 1 mg/m³. The ACGIH TLV for nickel is 1 mg/m³ and TLV for soluble compounds is 0.1 mg/m³. These limitations will also result in a signification reduction from the 5 mg/m³ general fume (NOC) level. Gaseous reaction products may include carbon monoxide and carbon dioxide.

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 spray area if positioned in the workers breathing zone. See ANSI / AWS FI.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.

SECTION VI - HEALTH HAZARD DATA

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

SHORT TERM (ACUTE) – overexposure to dust and fumes may result in discomfort such as: dizziness, nausea, or dryness or irritation of nose, throat, or eyes.

Chromate's 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 a metallic taste, nausea, tightness in the chest, fever and allergic reactions.

Fluorides can cause pulmonary edema bronchitis.

LONG TERM (CHRONIC) – overexposure to dust and fumes can lead to siderosis (iron deposits in the lung) and affect pulmonary function.

Studies have shown that production workers exposed to hexavalent chromium compounds have an increased incidence of lung cancers. Chromate 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 overexposure 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 required to be considered as carcinogenic by OSHA.

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

THRESHOLD LIMIT VALUE – The ACGIH 1985-86 recommended limit for welding fumes not otherwise classified (NOC) is 5mg/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, which may modify this TLV - TWA.

FLAME RAYS can injure eyes and burn skin.

HEAT RAYS (infrared radiation from flame or hot metal) can injure eyes. **NOISE** appropriate hearing protection must be worn at all times during operation.

CARCINOGENICITY Chromium and nickel and their compounds are on the IARC and NTP lists as posing a carcinogenic risk to humans.

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

SECTION VII – PRECAUTIONS FOR SAFE HANDLING & USE/APPLICABLE CONTROL MEASURES

Read and understand the manufacturer's instructions and the precautionary label on the product. See American National Standard Z49.1, Safety in Welding and cutting published by the American Welding Society, P.O. Box 351040, Miami, FL 33135 and OSHA Publication 2206 (29CFR1910).US Government Printing Office, Washington, D.C. 20402 for more detail on many of the following.

VENTILATION – Use enough ventilation, local exhaust at the spray plume, to keep the dust, fumes and gases below TLV's in the worker's breathing zone and the general area. Train the operator to keep his head out of the fumes.

RESPIRATORY PROTECTION – Use fume respirator or air supplied respirator when working in confined space or where local exhaust or ventilation does not keep exposure below TLV.

EYE PROTECTION – Wear proper shielding apparatus. As a rule of thumb, start with a shade that is too dark to see the spray plume. Then go to the next lighter shade which gives sufficient view of the spray plume. Provide protective screens and eye protection, if necessary to shield others.

PROTECTIVE CLOTHING – Wear head, hand and body protection which help to prevent injury. See ANSI Z49.1. At a minimum, this includes appropriate clothing and a protective face shield.

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. The information herein is supplied in good faith, but no warranties are expressed or implied.

SECTION XI – DEFINITIONS

ACGIH American Conference of Governmental Industrial Hygienists
CAS No. Chemical Abstracts Service Number
CLG Ceiling Limit
EEC European Economic Community
IARC International Agency for Research on Cancer
NIOSH National Institute for Occupational Safety and Health

NOC Not Otherwise Classified
NTP National Toxicology Program
OSHA US Department of Labor, Occupational Safety and Health Administration
PEL Permissible Exposure Level (1983)
STEL Short Term Exposure Limit
TLV Threshold Limit Value (1887-88)
TWA Time Weighted Average

SECTION XII – ADDITIONAL INFORMATION

The above information is believed to be accurate and represents the best information currently available to us. We make no warranty expressed or implied with respect to such information and we assume no liability resulting from its use. Since the use of the product is not within the control of Indurate Alloys Ltd, it is the user's obligation to determine the conditions of safe use of the product. Indurate Alloys Ltd. assumes no responsibility for injury or damage caused by abnormal use of the material even if reasonable safety procedures are followed.

For further information contact:

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