

**HARDFACING**  
**FLUX-COATED ELECTRODES AND OXY-ACETYLENE RODS**  
**MATERIAL DATA SAFETY SHEET**

**Section 1 – Identification**

**Manufacturer's Name:** Postle Industries, Inc. P.O. Box 42037 Cleveland, Ohio 44142  
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**Group A – Iron base Hardfacing Electrodes – 21, 27, 205, 206HD, 207, 214, 215HD, 216HD, 217HD, 218HD, 219HD, 248CB**

**Group B – Nickel and Cobalt Hardfacing electrodes and rods, with or without tungsten carbide  
 14, 14TC and bare and coated electrode 2501, 2506, 2512, 2521**

**Group C – Iron Base Tungsten Carbide Oxy-Acetylene Hardfacing Rods - 29, 219 bare and coated electrodes**

**Section 2 – Hazardous Ingredients**

**IMPORTANT** - This section covers the hazardous materials from which this product is manufactured. The fumes and gases produced during welding with normal use of this product are also addressed in Section 5. The term "hazardous" in this section should be interpreted as a term required and defined in OSHA Hazard Communication Std. (29 CFR Part 1910).

Hazardous Ingredients	% Weight			CAS No.	Exposure Limit (mg/m <sup>3</sup> )	
	Group A	Group B	Group C		OSHA PEL	ACGIH TLV
Iron	40-95	<5	30-60	7439-89-6	5.0 (R) 10.0 - Oxide Fume	5.0 (R) - Fe2O3
Chromium (1)	1-40	10-40		7440-47-3	1.0 - Metal 0.5 - Cr II Compounds 0.5 - Cr III Compounds 0.005 - Cr VI Compounds (A1)	0.5 - Metal 0.5 - Cr III Compounds 0.05 - Cr VI Soluble Compounds {A1} 0.01 - Cr VI Insoluble Compounds (A1)
Manganese and Mn Compounds (1)	1-25	<5	<3	7439-96-5	5.0 CL - Fume 3.0 STEL	0.2 - Dust & Fume
Columbium	0-10			7440-03-1	5.0 (R)	3.0 (R)
Vanadium (3)	0-10			7440-62-2	0.1 CL - Fume as V2O5 0.5 CL - Respirable Dust as V2O5	0.02 (R) - Fume as V2O5 0.02 (R) - Dust as V2O5
Nickel (1)	0-10	0-75		7440-02-0	1.0 - Metal 1.0 - Soluble Compounds 1.0 - Insoluble Compounds 5.0 (R) – Soluble Compounds	1.0 (I) - Metal 0.1 (I) - Soluble Compounds 0.2 (I) - Insoluble Compounds {A1} 0.5 (R) - Soluble Compounds
Molybdenum	0-10	0-10		7439-98-7	5.0 (R)	2.5 as F
Fluorides	0-10	<5		7789-75-5	2.5 - as F	10.0
Titanium Dioxide	0-10	5-15		13463-67-7	15.0 Dust	3.0 (R)
Silicon	0-5	<5	<3	7440-21-3	5.0 (R)	0.025 (R) (A2)
Silica (Amorphous Silica Fume)	0.1-5	<5	<3	14808-60-7 69012-64-2	0.1 (R) 0.8	3 (R)
Tungsten	0-10			7440-33-7	5.0 (R)	5.0, 10 STEL - Insoluble compounds 1.0, 3 STEL - Soluble compounds
Tungsten Carbide 219HD only Group A	50-65			12070-12-1	NL	NL
14TC only Group B		30-60		12070-12-1	NL	NL
Group C			50-70	12070-12-1	NL	NL
Calcium Carbonate	1-10	1-10		1317-65-3	5.0 (R) 5.0 - as CaO	3.0 (R) 2.0 - as CaO
Cobalt (1)		0-60		7440-48-4	0.1 - Dust & Fume	0.02 - Dust & Fume
Silicate Binders	<5			-----	NL	NL

(R) – Respirable Fraction (I) – Inhalable Fraction CL - Ceiling Limit STEL – Short time exposure limit

(A1) – Confirmed Human Carcinogen (A2) – Suspected Human Carcinogen

(1)SARA – Reportable material under section 313 of SARA

(2)SARA – Reportable material under section 313 of SARA only in fibrous form

(3)SARA – Reportable material under section 313 of SARA as dust or fume

**The exposure limit for welding fume has been established at 5 mg/m<sup>3</sup> with OSHA's PEL and ACGIH's TLV. The individual complex compounds within the fume may have lower exposure limits than the general welding fume PEL/TLV. An Industrial Hygienist, the OSHA Permissible Exposure Limits For Air Contaminants (29 CFR 1910.1000), and the ACGIH Threshold Limit Values should be consulted to determine the specific fume constituents present and their respective exposure limits.**

**Section 3 – Physical Data**

These products as shipped are nonhazardous, nonflammable, nonexplosive and nonreactive.

**Section 4 – Fire and Explosion Hazard Data**

Welding arc and sparks, and the use of oxy-fuel torches, can ignite combustibles and flammables. Refer to American National Standard Z49.1 for fire prevention during the use of welding and allied procedures.

**Section 5 – Reactivity Data – Hazardous Decomposition Products**

Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedures and electrodes used.

**Most fume ingredients are present as complex oxides and compounds and not as pure metals.** 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 being welded (such as paint, plating or galvanizing), the number of welders and the volume of the 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 2. Decomposition products of normal operation include those originating from the volatilization, reaction or oxidation of the materials shown in Section 2, plus those from the base metal and coating, etc., as noted above.

Monitor for the materials identified in Section 2. Reasonably expected decomposition products from normal use of these products include a complex of the oxides of the materials listed in Section 2. **Fumes from the use of these products may contain manganese, chromium, nickel, fluorides, calcium oxides, amorphous silica fume, vanadium, tungsten, copper, and cobalt whose exposure limits are lower than the 5 mg/m<sup>3</sup> PEL/TLV for general welding fume.** 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 ANSI/AWS F1.1, available from the "American Welding Society", P.O. Box 351040, Miami, FL 33135. Also, from AWS is F1.3 "Evaluating Contaminants in the Welding Environment - A Sampling Strategy Guide", which gives additional advice on sampling.]

## Section 6 – Exposure Limits - Health Hazard Data

### EFFECTS OF OVEREXPOSURE:

Electric arc welding may create one or more of the following health hazards: ARC RAYS can injure eyes and burn skin. ELECTRIC SHOCK can kill. See Section 7. FUMES AND GASES can be dangerous to your health. PRIMARY ROUTES OF ENTRY are the respiratory system, eyes and/or skin.

### SHORT-TERM (ACUTE) OVEREXPOSURE EFFECTS:

WELDING FUMES - May result in discomfort such as dizziness, nausea or dryness or irritation of nose, throat or eyes.

IRON, IRON OXIDE - None are known. Treat as nuisance dust or fume.

CHROMIUM - Inhalation of fume with chromium (VI) compounds can cause irritation of the respiratory tract, lung damage and asthma-like symptoms. Swallowing chromium (VI) salts can cause severe injury or death. Dust on skin can form ulcers. Eyes may be burned by chromium (VI) compounds. Allergic reactions may occur in some people.

MANGANESE - Metal fume fever characterized by chills, fever, upset stomach, vomiting, irritation of the throat and aching of body. Recovery is generally complete within 48 hours.

COLUMBIUM - Dust or fumes may cause irritation of the respiratory system, skin and eyes.

VANADIUM - Overexposure to the oxide causes green tongue, cough, metallic taste, throat irritation and eczema.

NICKEL, NICKEL COMPOUNDS - Metallic taste, nausea, tightness in chest, metal fume fever, allergic reaction.

TITANIUM DIOXIDE - Irritation of respiratory system.

MOLYBDENUM - Irritation of the eyes, nose and throat.

FLUORIDES - Fluoride compounds evolved may cause skin and eye burns, pulmonary edema and bronchitis.

SILICA (AMORPHOUS) - Dust and fumes may cause irritation of the respiratory system, skin and eyes.

TUNGSTEN - Dust may cause irritation of the skin and eyes. Inhalation of dust may cause acute airways obstructive asthma which is reversible following overexposure. Symptoms are tightening chest and productive cough.

CALCIUM OXIDE - Dust or fumes may cause irritation of the respiratory system, skin and eyes.

COBALT - Pulmonary irritation, cough, dermatitis, weight loss.

### LONG-TERM (CHRONIC) OVEREXPOSURE EFFECTS:

WELDING FUMES - Excess levels may cause bronchial asthma, lung fibrosis, pneumoconiosis or "siderosis."

IRON, IRON OXIDE FUMES - Can cause siderosis (deposits of iron in lungs) which some researchers believe may affect pulmonary function. Lungs will clear in time when exposure to iron and its compounds ceases. Iron and magnetite (Fe<sub>3</sub>O<sub>4</sub>) are not regarded as fibrogenic materials.

CHROMIUM - Ulceration and perforation of nasal septum. Respiratory irritation may occur with symptoms resembling asthma. Studies have shown that chromate production workers exposed to hexavalent chromium compounds have an excess of lung cancers. Chromium (VI) compounds are more readily absorbed through the skin than chromium (III) compounds.

Good practice requires the reduction of employee exposure to chromium (III) and (VI) compounds.

MANGANESE - Long-term overexposure to manganese compounds may affect the central nervous system. Symptoms may be similar to Parkinson's Disease and can include slowness, changes in handwriting, gait impairment, muscle spasms and cramps and less commonly, tremor and behavioral changes. Employees who are overexposed to manganese compounds should be seen by a physician for early detection of neurological problems.

COLUMBIUM - No adverse long term health effects have been reported in the literature.

VANADIUM - Prolonged overexposure to vanadium pentoxide can cause nasal catarrh or nose bleeds and chronic respiratory problems.

NICKEL, NICKEL COMPOUNDS - Lung fibrosis or pneumoconiosis. Studies of nickel refinery workers indicated a higher incidence of lung and nasal cancers.

TITANIUM DIOXIDE - Pulmonary irritation and slight fibrosis.

MOLYBDENUM - Prolonged overexposure may result in loss of appetite, weight loss, loss of muscle coordination, difficulty in breathing and anemia.

FLUORIDES - Serious bone erosion (Osteoporosis) and mottling of teeth.

SILICA (AMORPHOUS) - Research indicates that silica is present in welding fume in the amorphous form. Long term overexposure may cause pneumoconiosis. Noncrystalline forms of silica (amorphous silica) are considered to have little fibrotic potential.

TUNGSTEN - Long term overexposure may cause pulmonary fibrosis characterized by a rapid onset of cough, sputum and dyspnea on exertion.

CALCIUM OXIDE - Prolonged overexposure may cause ulceration of the skin and perforation of the nasal septum, dermatitis and pneumonia.

COBALT - Repeated overexposure to cobalt compounds can produce reduced pulmonary function, diffuse nodular fibrosis of lungs and respiratory hypersensitivity. IARC considers cobalt compounds as possibly carcinogenic to humans (GROUP 2B).

### MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

Persons with pre-existing impaired lung functions (asthma-like conditions).

### EMERGENCY AND FIRST AID PROCEDURES:

Call for medical aid. Employ first aid techniques recommended by the American Red Cross.

Eyes & Skin: If irritation or flash burns develop after exposure, consult a physician.

### CARCINOGENICITY:

Chromium VI, cobalt, and nickel compounds must be considered carcinogens according to OSHA (29 CFR 1910.1200). Chromium VI compounds are classified as IARC Group 1 and NTP Group 1 carcinogens. Nickel compounds are classified as IARC Group 1 and NTP Group 2 carcinogens. Cobalt compounds are classified as IARC Group 2B carcinogens. Welding fumes must be considered as possible carcinogens under OSHA (29 CFR 1910.1200).

### CALIFORNIA PROPOSITION 65:

WARNING: This product contains or produces a chemical known to the State of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code Section 25249.5 et seq.)

## Section 7 – Special Precautions for Safe Handling and 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, DC 20210 for more details on the following.

**Eye Protection** - Wear helmet or use face shield with filter lens. Provide protective screens and flash goggles, if necessary, to shield others. 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.

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

**Respiratory Protection** - Use NIOSH approved or equivalent fume respirator or air supplied respirator when welding in confined space or where local exhaust or ventilation does not keep exposure below TLV.

**Protective Clothing** - Wear hand, head, 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.

**Spill and Waste Disposal** - Product is a non-hazardous solid. No special precautions are required for spills of bulk material. Scrap metal can be reclaimed for reuse. 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.

**SPECIAL PRECAUTIONS (IMPORTANT)** - Maintain exposures below the TLV. Use industrial hygiene air monitoring to ensure that your use of this material does not create exposures which exceed TLV. Always use exhaust ventilation. 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, DC 20210.

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