

BEI Listed by ACGIH as a substance for which there are biological exposure indices

WARNING: This product contains or produces a chemical known to the state of California to cause cancer.
WARNING: This product contains or produces a chemical known to the state of California to cause birth defects or other reproductive harm.
IMPORTANT: This section covers the material from which this product is manufactured. The fumes and gases produced during welding with this product are covered by SECTION VI.

Section III - Physical and Chemical Characteristics

Boiling Point	N/A	Specific Gravity (H ₂ O = 1)	N/A
Vapour Pressure (mm Hg.)	N/A	Melting Point	N/A
Vapour Density (air = 1)	N/A	Evaporation Rate (Butyl Acetate = 1)	N/A
Solubility in Water	insoluble		
Appearance and Odour	Unalloyed and low alloyed basic coated electrodes are welding consumables consisting of a solid core wire and a gray coating, no specific odor		

Section IV - Fire and Explosion Hazard Data

Flash Point (Method used)	Flammable Limits	LEL	UEL
non-flammable	N/A	N/A	N/A
Extinguishing Media N/A			
Special fire fighting procedures: N/A			
IMPORTANT! Product is non flammable! Welding arc and spark can ignite combustibles and flammables. Refer to ANSI/ASC Z 49.1-1983 Section 6 for fire prevention during the use of welding and allied products.			
Unusual fire and explosion hazards: N/A			

Section V – Reactivity Data

Stability	Unstable	-	Conditions to avoid	N/A
	Stable	X		

Incompatibility (Materials to avoid): N/A

Hazardous Decomposition or By-products:

Important: Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, and the process, procedures, and electrodes 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 being welded (such as paint, plating, galvanising, or phosphate coatings on steels which would produce phosphine gas), 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 vapours from cleaning and degreasing activities which may be decomposed by the arc into toxic gases such as phosgene).

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 electrode. Also, new compounds not in the electrodes may form. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in **SECTION II**, plus those from the base metal and coating, etc..., as noted above.

Reasonably expected fume constituents of this product would include: Example for Carbon dioxide shielded flux-cored electrode (AWS 5.20 E70-T-1): Reasonably expected fume constituents of this product would include: primarily oxides of Iron; secondarily complex oxides of Manganese, Silicon, Titanium and Sodium. The present ACGIH TLV for Manganese, 0.2 mg/m³ will result in a significant reduction from the 5 mg/m³ general welding fume (NOC) level. Example for Stainless Steel covered electrodes (AWS 5.4): Reasonably expected fume constituents of this product would include: primarily fluorides and complex oxides of Iron and Silicon, secondarily complex oxides of Manganese, titanium, chromium, nickel, sodium and potassium. **The present 1995 OSHA PEL (Permissible Exposure Limit) for hexavalent Chromium (Cr⁺⁶) is 0.05 mg/m³ which will result in a significant reduction from the 5 mg/m³ general welding fume (NOC) level.** The limit of 0.05 mg/m³ for hexavalent chromium from the decomposition products in these electrodes comes from the limit shown at the bottom of OSHA Table Z-2, which is for 0.1 mg of CrO₃- which calculates to 0.05 mg of Cr⁺⁶/m³. It applies to soluble chromates of the types found in covered stainless electrode fumes. Reasonably expected gaseous constituents would 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 from inside the welder's helmet if worn or in

the worker's breathing zone. See ANSI/AWS F1.1 and ANSI/AWS F1.2-1992

Hazardous/Polymerisation	May occur	-	Conditions to avoid	N/A
	Will not occur	X		

Section VI - Health Hazard Data

Route(s) of entry Inhalation (**)
 ** Inhalation of fume. Skin (***) Ingestion (not likely)

*** Rays from welding operations can injure eyes and burn skin.

Health Hazards (acute and chronic)

Welding electrodes and wires are non-hazardous solids at ambient temperature. Actual exposure should be determined by monitoring the fume in the operator's breathing zone. Compounds of Chromium and Nickel in the fume should be considered possible carcinogens per OSHA29. CFR 1910. 1200. No clear association, however, has been established between Cr and Ni in welding fume and the development of cancer.

Short term overexposure to welding fumes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat or eyes and may aggravate pre-existing respiratory problems (e.g. asthma, emphysema). See **SECTIONS IV and VII**. Exposure to extremely high levels of fluorides can cause abdominal pain, diarrhea, muscular weakness, and convulsions. In extreme cases it can cause loss of consciousness and death. to welding fumes may result in discomfort, dizziness, nausea, or dryness or irritation of the throat.

Long term overexposure to welding fumes can lead to siderosis (iron deposits in lung) and may affect pulmonary function. Manganese overexposure can affect the central nervous system, resulting in impaired speech and movement. The primary entry route for welding fumes and gases is by inhalation Bronchitis and some lung fibrosis have been reported. Repeated exposure to fluorides may cause excessive calcification of the bone and calcification of ligaments of the ribs, pelvis and spinal column. May cause skin rash.

Arc Rays can injure eyes and burn skin. Electric Shock can kill. Before use, read and understand the manufacturer's instructions., MSDSs, and your employer's safety practices. Keep your head out of the fumes. Use enough ventilation, exhaust at the arc, or both, to keep fumes and gases from your breathing zone and the general area. Wear correct eye, ear, and body protection.. Do not touch live electrical parts. See American National Standard Z49.1, and OSHA Safety and Health Standards.

Carcinogenicity

NICKEL: The International Agency for Research on Cancer indicates nickel refining and "certain nickel compounds" were cancer-causing, but could not state with certainty which forms of nickel may be carcinogenic. The National Toxicology Program lists nickel powder, nickel subsulfide, nickel oxide, nickel carbonate, nickel carbonyl and nickelocene as substances "that may reasonably anticipated to be carcinogens." Because of this, the OSHA Hazard Communication Standard requires that everyone who manufactures or imports these substances or mixtures or alloys containing these substances must warn of a cancer hazard on their MSDS's and labels. This warning is mandated by OSHA even though studies have not demonstrated cancer risks associated with the use of nickel. Intramuscular injection and implantation of nickel powder produced localized tumors in rats and mice. Inhalation studies using animals showed no evidence of carcinogenicity.

CHROMIUM: The International Agency for Research on Cancer and The National Toxicology Program indicates there is sufficient evidence for carcinogenicity of chromium compounds both in humans and experimental animals. IARC notes that "the compounds responsible for the carcinogenic effect in humans cannot be specified." Studies with chromium metal and trivalent forms of chromium compounds have shown inadequate evidence for carcinogenicity in both animals and humans.

CRYSTALLINE SILICA: The National Toxicology Program indicates there is sufficient evidence for the carcinogenicity or respirable crystalline silica in experimental animals. Increases in incidence of lung cancers have been found in inhalation studies in rats. An IARC working group reported there is limited evidence for the carcinogenicity of crystalline silica in humans.

Sign and symptoms of exposure:

Short term exposure to welding fumes may result in discomfort, dizziness, nausea, or dryness or irritation of the throat.

Medical conditions generally aggravated by exposure:

Individuals with impaired pulmonary functions or illness may have symptoms exacerbated by fume irritants.

Emergency and first aid procedures:

Remove from dust or fume exposure. If breathing has stopped perform artificial respiration. Summon medical aid immediately.

Section VII/VIII - Precautions for Safe Handling and Use

Steps to be taken in case material is released or spilled N/A

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

Precautions to be taken in handling and storing: Avoid humidity and temperature shocks.

Other precautions: Electric shock from arc welding equipment can kill. When welding welding arc or torch flame may be a source of ignition of combustible.

Section VIII – Control Measures

special protection information and precautions : Read and understand the manufacturer's instruction and the precautionary label on the product. See American National Standard Z49.1 and OSHA Publication (29 CFR 1910 Hazard Communication Standard for more detail on many of the following.

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. Keep exposures as low as possible

Respiratory Protection: Use respirable fumes respirator or air supplied respirator when welding in confined space or where local exhaust or ventilation does not keep exposure below the recommended exposure limit.

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 the next lighter shade which gives sufficient view of the weld zone.

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, and well as dark substantial clothing. Train the welder not to touch live electrical parts and to insulate himself from work and ground.

REFERENCED STANDARDS

In this publication, reference is made to the standards listed below. Copies are available from the indicated sources.

Official Journals of the European Communities L 314/38, L174/54, referencing Council Regulations 93/112/EC, 91/155/EEC, 88/379/EEC and 67/548/EEC

American Welding Society, Inc.
550 N.W. LeJeune Road
Miami, FL 33126

AWS F1.1-1992 Methods for Sampling Airborne Particulates Generated by Welding and Allied Processes
AWS F1.2-1992 Laboratory Method for Measuring Fume Generation Rates and Total Fume Emission for Welding and Allied Processes

American National Standards Institute
11 West 42nd Street
New York, NY 10036
ANSI Z49.1-1994 Safety in Welding, Cutting and Allied Processes

Superintendent of Documents Administration
U.S. Government Printing Office
Washington, DC 20402
OSHA Standard 29 CFR 1910 Toxic and Hazardous Substances

Subpart Z
1910.1000 Air Contaminants Table Z-2

U.S. Department of Labor
Occupational Safety and Health Administration
200 Constitution Avenue
Room N-3101
Washington, DC 20210
OSHA Standard 29 CFR Material Safety Data Sheet (Non-Mandatory Form) 1910.1200

Environmental Protection Agency
401 M Street, S.W.
Washington, DC 20460
Sections 311, 312, 313 Emergency Planning and Community Right-To-Know Act of 1986 (EPCRA)

American Conferencel of Governmental Industrial Hygienists
Technical Affairs Office
Kemper Woods Center
1330 Kemper Meadow Drive
Cincinnati, OH 45240
Threshold Limit Values (TLVs) for Chemical Substances and Physical Agents and

Exposure Indices (BEIs)

Biological

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