
SECTION 3 – PHYSICAL/CHEMICAL CHARACTERISTICS

Tubular wire containing alloys and minerals

SECTION 4 – FIRE AND EXPLOSION HAZARD DATA

(Nonflammable) Welding arc and sparks can ignite combustibles and flammables. Refer to American National Standard A49.1 for fire prevention during the use of welding and allied procedures.

NFPA NUMERICAL CODES:	Health Hazard	0
	Fire Hazard	1
	Reactivity Hazard	0

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, procedure 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, 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 2. 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 2, plus those from the base metal and coating, etc., as noted above.

Reasonably expected decomposition products from normal use of the products include a complex of the oxides of the materials listed in Section 2, as well as carbon monoxide, carbon dioxide, ozone and nitrogen oxides. **The fume limit for chromium, nickel, manganese and cobalt may be reached before the general limit for welding fumes (5 mg/m³) is reached.**

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 "Method for Sampling Airborne Particles Generated by Welding and Allied Processes" and "Characterization of Arc Welding Fume" available from the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.

SECTION 6 – HEALTH HAZARD DATA

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

ARC RAYS can injure eyes and burn skin.

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

ELECTRIC SHOCK can **KILL**.

NOISE can damage hearing.

CARCINOGENICITY Chromium, nickel, cobalt, 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 American Red Cross.

SHIELDING GASES such as argon, helium and carbon dioxide are asphyxiants and adequate ventilation must be provided.

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

SHORT TERM (ACUTE) - overexposure to welding fumes may result in discomfort such as dizziness, nausea, or 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 a metallic taste, nausea, tightness in the chest, fever and allergic reactions.

Manganese fume may cause flu like symptoms (metal fume fever).

Fluorides can cause pulmonary edema bronchitis.

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

Long term overexposure 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.

Chromium VI compounds are required by OSHA to be considered carcinogenic. Long term exposure to Chromium and Chromium III Oxide dust can cause scaling, redness, itchiness, and a burning sensation on the skin.

Long term overexposure to nickel compounds may cause lung fibrosis or pneumoconiosis. Soreness and itchiness of the nose and change in skin color and/or appearance may also result. Nickel and its compounds are required to be considered as carcinogenic by OSHA.

THRESHOLD LIMIT VALUE - The ACGIH 1994-95 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 5 for specific fume constituents which may modify this TLV - TWA.

SECTION 7 – PRECAUTIONS FOR SAFE HANDLING AND USE/APPLICABLE CONTROL MEASURES

Read and understand the manufacturer's instructions and the precautionary label on the products. See American National Standard Z49.1, *Safety in Welding, Cutting, and Allied Processes*, published by the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126 and OSHA Publication 2206 (29CFR1910), US Government Print Office, Washington, D.C. 20402 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 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.

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 8 - DEFINITIONS

CAS No.	Chemical Abstracts Service Number
OSHA	U.S. Department of Labor, Occupational Safety and Health Administration
PEL	Permissible Exposure Level
ACGIH	American Conference of Governmental Industrial Hygienists
TLV	Threshold Limit Value
TWA	Time Weighted Average
STEL	Short Term Exposure Limit
CLG	Ceiling Limit
NOC	Not Otherwise Classified
IARC	International Agency for Research on Cancer
NTP	National Toxicology Program