

SAFETY DATA SHEET

SECTION 1 IDENTIFICATION

Product Stock No: 5692
Product Name: TURBALOY® 316
Product use: Welding Wire and Rod

Manufacturer's name: UNITED STATES WELDING CORPORATION
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SECTION 2—HAZARDS IDENTIFICATION

The article is NOT classified as dangerous according to Directive 1999/45/EC
 Byproducts generated during the welding process are considered hazardous.

Warning!- Avoid breathing fumes and gases, they may be dangerous to your health. Always use adequate ventilation. Always use appropriate personal protective equipment.
Primary Routes of Entry: Respiratory System, Eyes and/or Skin.
Electric Shock: Arc welding and associated process can kill. See Section 8
 See Section 11 for more detailed information on health effects and symptoms.

Arc Rays: The welding arc can injure eyes and burn skin.
Fumes and Gases: Can be dangerous to your health.



WARNING

SECTION 3—COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS No.	EC No.	Wt. %	Classification
Chromium	7440-47-3	231-157-5	20.00	Not Classified
Copper	7440-50-8	231-159-6	0.75	Not Classified
Iron	7439-89-6	231-096-4	Bal	Not Classified
Manganese	7439-96-5	231-105-1	2.50	Xn, R20/22
Molybdenum	7439-98-7	231-107-2	3.00	Not Classified
Nickel	7440-02-0	231-111-4	14.00	Carc. Cat. 3: R40, R43
Silicon	7440-21-3	231-130-8	0.65	Not Classified

The above percent concentrations are considered nominal and are provided for industrial hygiene purposes. They do not represent a certification of content.

SECTION 4 FIRST AID MEASURES

These measures apply primarily to the byproducts produced during welding.

Inhalation - For over-exposure to airborne fumes and particulate, remove exposed person to fresh air. If breathing is difficult or has stopped, administer artificial respiration or oxygen as indicated. Seek medical attention promptly.

Skin - Remove contaminated clothing. Wash affected areas with soap or mild detergent and water. If thermal burn has occurred, flush area with cold water and seek medical attention. If mechanical abrasion has occurred, seek medical attention.

Eye - To remove dusts or fumes flush with water for at least fifteen minutes. If irritation persists, obtain medical assistance. For radiation burns due to arc flash, see physician.

Ingestion - While Ingestion is not a likely route of exposure for these products. If swallowed call physician immediately! Do not induce vomiting unless directed by medical personnel. Never give fluids or induce vomiting if person is unconscious, having convulsions, or not breathing.

SECTION 5 FIRE-FIGHTING MEASURES

Welding consumables applicable to this sheet as shipped are nonreactive, nonflammable, non explosive and essentially nonhazardous until welded, Welding arcs and sparks can ignite combustibles and flammable products. Unused welding consumables may remain hot for a period of time after completion of a welding process. See American National Standard (ANSI) Z49.1 for further general safety information on the use and handling of welding consumables and associated procedures.

Fire-Fighting Equipment: Wear a self-contained breathing apparatus (SCBA) with a full face-piece operated in pressure-demand or positive-pressure mode and full protective clothing.

SECTION 6 ACCIDENTAL RELEASE MEASURES

As shipped this product does not pose a hazard to the environment.

SECTION 7 HANDLING AND STORAGE

HANDLING: No specific requirements in the form supplied. Handle with care to avoid cuts. Wear gloves when handling welding consumables. Avoid exposure to dust. Do not ingest. Some individuals can develop an allergic reaction to certain materials. Retain all warning and product labels.

STORAGE: Keep separate from acids and strong bases to prevent possible chemical reactions.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Components	OSHA PEL (mg/m ³)	ACGIH (mg/m ³)
Aluminum	15mg/m ³ (Total metal dust) 5 mg/m ³ (Metal dust – respirable fraction)	10 mg/m ³ (Metal dust) 5 mg/m ³ (Welding fumes)
Beryllium	0.002 mg/m ³ , 0.005 mg/m ³ (ceiling), 0.025 mg/m ³ (water soluble)	0.002 mg/m ³
Chromium *	1.0 mg/m ³ (Metal as Cr)	0.5 mg/m ³
Cobalt	0.05 mg/m ³ (As Co metal)	0.05 mg/m ³ (Dust & fume as Co)
Copper	1 mg/m ³ (Dust & mists, as Cu), 0.1 mg/m ³ (Fumes as Cu)	1 mg/m ³ (Dust & mists, as Cu), 0.2 mg/m ³ (Fumes)
Iron	No limit set (For Fe ₂ O ₃ dust & fumes the PEL is 10 mg/m ³ as Fe)	No limit set (For Fe ₂ O ₃ fume the TLV is 5 mg/m ³ as Fe)
Manganese	5 mg/m ³ (Ceiling, as Mn compounds); 1 mg/m ³ (Fume, as Mn); STEL 3 mg/m ³ (Fume as Mn)	5 mg/m ³ (Dust & compounds, as Mn); 1 mg/m ³ (Fume, as Mn); STEL 3 mg/m ³ (Fume as Mn)
Molybdenum	10 mg/m ³ (Insoluble compounds, total dust as Mo)	mg/m ³ (Insoluble compounds, as Mo)
Nickel	1 mg/m ³ for metal and insoluble compounds as Ni	1 mg/m ³ as metal
Silicon	10 mg/m ³ Total dust; 5 mg/m ³ Respirable fraction	10 mg/m ³
Titanium	No limit set	No limit set
Tungsten	5 mg/m ³ insoluble compounds, as W; STEL 10 mg/m ³ for insoluble compounds, as W	5 mg/m ³ insoluble compounds, as W; STEL 10 mg/m ³ for insoluble compounds, as W

SECTION 8 CONTINUED

Addition Information:	* A portion of metallic chromium may be converted during the welding process to hexavalent chromium. Hexavalent chromium is classified as an IARC Group 1 Carcinogenic. NTP classifies hexavalent chromium as Known to be Carcinogenic.
Monitoring Procedures:	If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be determine the effectiveness of ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to European Standard EN689 for methods for the assessment of exposure by inhalation to chemical agents and national guidance documents for methods for the determination of hazardous substances.
Ventilation:	Use process enclosures, local ventilation or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fumes or mist, use ventilation to keep exposure to airborne contaminants below the exposure limits.
Respiratory Protection:	Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels the hazards of the product and the safe working limits of the selected respirator.
Hand Protection:	Gloves should be worn to minimize contact. During the welding process, heat insulated gloves are recommended.
Eye Protection:	Safety glasses or goggles are recommended when handling this material. During the welding process, safety goggles and dark lenses must be worn.
Skin Protection:	Personal protective equipment for the body should be selected based on the task being performed and the risk involved and should be approved by a specialist before handling this product.
Hearing Protection:	During the welding process, the operator and other personal close to the welding operation must be protected from excessive noise. Hearing protection that meets local standards should be used.
Hygiene Measures:	Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period, appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

This section applies primarily to the wire as supplied.		
Physical State: Wire or rod.		
Color: Metallic.		
Odor: Oderless		
Vapor Pressure: Not applicable	Water Solubility: Insoluble	Boiling Point: Not applicable
Vapor Density (Air=1): Not applicable	Viscosity: Not applicable	Evaporation Rate: Not applicable
Density: ~8 gm/cc	Melting Point: ~2350 °F	pH: Not applicable

SECTION 10 STABILITY AND REACTIVITY

General: Welding consumables applicable to this sheet are solid and nonvolatile as shipped. This product is only intended for use per the welding parameters it was designed for. When this product is used for welding, hazardous fumes may be created. Other factors to consider include the base metal, base metal preparation and base metal coating. All of these factors can contribute to the fume and gases generated during welding. The amount of fume varies with the welding parameters.	
Stability: This product is stable under normal conditions.	Reactivity: Contact with acids or strong bases may cause generation of gas.

SECTION 11 TOXICOLOGICAL INFORMATION

SHORT-TERM (ACUTE) OVEREXPOSURE EFFECTS: Welding Fumes – May result in discomfort such as dizziness, nausea or dryness or irritation of nose, throat or eyes. Aluminum Oxide – Irritation of the respiratory system. Chromium – Inhalation of fumes 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. Iron, Iron Oxide – None are known. Treat as nuisance dust or fume. Magnesium, Magnesium Oxide – Overexposure to the oxide may cause metal fume fever characterized by metallic taste, tightness of chest and fever. Symptoms may last 24 to 48 hours following overexposure. 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 of the overexposure. Molybdenum – Irritation of the eyes, nose, throat. Nickel, Nickel Compounds – Metallic taste, nausea, tightness in chest, metal fume fever, allergic reaction. Titanium Dioxide – Irritation of respiratory system.
LONG TERM (CHRONIC) OVEREXPOSURE EFFECTS: Welding Fumes – Excess levels may cause bronchial asthma, lung fibrosis, pneumoconiosis or “siderosis”. Aluminum Oxide – Pulmonary fibrosis and emphysema. 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. Iron, Iron Oxide Fumes – Can cause siderosis (deposits of iron in lungs) which some researchers believe may affect pulmonary functions. Lungs will clear in time when exposure to iron and its compounds ceases. Iron and magnetite (Fe3O4) are not regarded as fibrogenic materials. Magnesium, Magnesium Oxide – No adverse long term health effects have been reported in the literature. 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 neurologic problems. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait. Molybdenum – Prolonged overexposure may result in loss of appetite, weight loss, loss of muscle coordination, difficulty in breathing and anemia. 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.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Persons with pre-existing impaired lung functions (asthma-like conditions). Persons with a pacemaker should not go near welding and cutting operations until they have consulted their doctor and obtained information from the manufacturer of the device. Respirators are to be worn only after being medically cleared by your company-designated physician.
CARCINOGENICITY: Chromium VI compounds, nickel compounds are classified as IARC Group 1 and NTP Group K carcinogens. Titanium dioxide compounds are classified as IARC Group 2B carcinogens, Chromium VI compounds, nickel compounds, and welding fumes must be considered as carcinogens under OSHA (29 CFR 1910-1200).

CALIFORNIA PROPOSITION 65: WARNING: THIS PRODUCT CONTAINS A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER AND BIRTH DEFECTS (OR OTHER REPRODUCTIVE HARM).

SECTION 12 ECOLOGICAL INFORMATION

Welding processes can releases fumes directly to the environment. Welding wire can degrade if left outside and unprotected. Residues from welding consumables and processes could degrade and accumulate in the soil and groundwater.

SECTION 13 DISPOSAL CONSIDERATION

Use recycling procedures if available. Discard any product, residue, packaging, disposable container or liner in an environmentally acceptable manner, in full compliance with Federal, State and local regulations.
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SECTION 14 TRANSPORT INFORMATION

Not international regulations or restrictions are applicable. No special precautions are necessary.

SECTION 15 REGULATORY INFORMATION

This information applies to the wire as supplied.	
SARA Section 313 Supplier Notification	
The product covered by this MSDS may contain the following toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know act of 1986 and of 40 DFR 372: Beryllium, Chromium, Copper, Manganese and Nickel. Refer to Section 3 of the MSDS for percentage of each element by weight and CAS number.	
Risk Phrases:	R40- Limited evidence of a carcinogenic effect. R42/43: May cause sensitization BY INHALATION AND SKIN CONTACT. R15- Contact with water liberates extremely flammable gases. R10- Flammable
Safety Phrases:	S22- Do not breathe dust. S24- Avoid contact with skin S37- Wear suitable protective gloves
Product Use:	Classification and labeling have been performed according to EU Directives 67/548/EEC and 1999/45/EC (including amendments) and the intended use.
Industrial Application:	Used by welding

SECTION 16 OTHER INFORMATION

For additional information please refer to the following sources:	
USA:	American National Standard (ANSI) Z49.1 “Safety in Welding and Cutting”, ANSI/American Welding Society (AWS) F1.5 “Methods for Sampling and Analyzing Gases from Welding and Allied Processes”, ANSI/AWS F1.1 “Method for Sampling Airborne Particles Generated by Welding and Allied Processes”, AWSF3.2M/F3.2 Ventilation Guide for Weld Fume”, American Welding Society, 550 North Le Jeune Road, Miami, Florida, 33135. Safety and Health Fact Sheets available from AWS at www.aws.org OSHA Publication 2206 (29 C.F.R. 1910) , U.S. Government Printing Office, Superintendent of Documents, P. O. Box 371954, Pittsburgh, PA. 15250-7954. Threshold Limit Values and Biological Exposure Indices , American Conference of Governmental Hygienists (ACGIH), 6500 Glenway Ave., Cincinnati, Ohio 45211, USA. NFPA 51B “Standard for Fire Prevention During Welding, Cutting and Other Hot Work” published by the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169.
UK:	WMA Publication 236 and 237 , “Hazards from Welding Fume”, The arc welder at work, some general aspects of health and safety:.
Canada:	CSA Standard CAN-CSA-W117.2-01 “Safety in Welding, Cutting and Allied Processes”.

NOTICE

To the best of our knowledge the information herein is accurate. However, United States Welding Corp. does not assume liability whatsoever for the accuracy or completeness of the information contained herein.
Final Determination of Suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.