



Safety Data Sheet

May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200.

Section 1: Product and Company Identification

Product Name: **ER90SB3**

Product type and use: ER90SB3 is used for the welding of high heat resisting. XCr-Mo alloyed steels which are used for the production of boilers tubes and pipes and nitride steels. Weld metal is resistant to temperatures up to +600°C.

Classification: TS EN ISO 21952-A : G Z Cr Mo 2 Si
EN ISO 21952-A : G Z Cr Mo 2 Si
TS EN ISO 21952-A : W Z Cr Mo 2 Si
EN ISO 21952-A : W Z Cr Mo 2 Si
AWS A5.28 : ER 90 S-B3

Manufacturer: TECHNIWELD USA LLC
Physical Address: 6205 BOAT ROCK
BLVD ATLANTA, GA
30336

Mailing Address: P.O. Box 44226
ATLANTA, GA 30336

Business Phone: 800-445-2152
Business Fax: 404-699-7800
E-mail Address: info@Techniweldusa.com
Web Address: www.Techniweldusa.com
Emergency Phone: CHEMTREC (24-Hour) 1-800-424-9300
Outside of the USA & Canada 1-703-527-3887

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Section 2: Hazards Identification

The products are not considered to be hazardous by the manufacturer; however they can contain hazardous ingredients. Different kinds of fume and dust occur during the welding and grinding processes. Chromium-VI compounds and nickel oxides might occur, if product contains nickel and chromium, which are classified as carcinogenic. In addition irritant substances such as fluorides and manganese oxides as well as fine dusts (mostly iron oxides) occur.

Welding electrodes and wires are non-hazardous solids at ambient temperature. Skin contact is normally not hazardous but should be avoided to prevent possible allergic reaction. Avoid eye contact or inhalation of dust or fumes from the product. Occupational exposure limits of components are described in section 8. Actual exposure should be determined by monitoring the fume in the operator's breathing zone.

When this product is used in a welding process the most significant hazards are electric shock, fumes, gases, radiation, spatter, slag and heat. Electric shock can kill. Arc rays can damage eyes and burn skin. Spatter and slag can damage eyes. Spatter, slag, melting metal, arc rays and hot welds can cause burn injuries and start fires. When welding arc or torch flame may be a source of ignition of combustible.

The primary entry route for welding fumes and gases is by inhalation. Short term overexposure to welding fumes may result in symptoms like dizziness, nausea, dryness or irritation of the nose, throat or eyes and may

aggravate pre-existing respiratory problems (e.g. asthma, emphysema). Long term overexposure to welding fumes may affect pulmonary function. Prolonged inhalation of nickel and chromium compounds above safe exposure limits can cause cancer. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait.

Carcinogenicity

Welding fumes must be considered as carcinogens. The International Agency for Research on Cancer has classified welding fumes as possibly carcinogenic to humans (Group 2B). Hence, before using welding wire and/or electrodes read and understand the manufacturer's instructions, SDSs, and your employer's safety practices. Take necessary precautions and use proper ventilation and absorption system to remove fumes and gases from your breathing zone and the general area. Keep your head out of the fumes. Do not breathe gas and fumes. Besides, wear correct eye, ear, and body protection and do not touch live electrical parts.

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 SDS'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. This product does not contain nickel.

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.

Section 3: Composition and Information on Ingredients

INGREDIENT	CAS NO.	%WEIGHT	Classification according to Regulation (EC) No 1272/2008 [CLP]	Classification according to 67/548/EEC, Dangerous Substances Directives
CARBON	7440-44-0	< 0.15	-	-
IRON	7439-89-6	Bal.	-	-
MANGANESE	7439-96-5	<1	-	-
SILICON	7440-21-3	< 1	-	-
COPPER	7440-50-8	<0.5	-	-
CHROMIUM	7440-47-3	<2.5	-	-
MOLYBDENUM	7439-98-7	<1	-	-
* Manganese Dioxide may occur during welding.				

Section 4: First Aid Measures

Inhalation: If dust or fumes inhaled, provide fresh air and call physician. If breathing has stopped, perform artificial respiration and obtain medical assistance immediately.

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

Skin contact: The unused welding product does not irritate the skin but wear gloves to prevent possible allergic reactions. For skin burns from arc radiation, promptly flush with cold water. Get medical attention for burns or irritations that persist. To remove dust or particles wash with mild soap and water.

Electric shock: Disconnect and turn off the power. Use a nonconductive material to pull victim away from contact with live parts or wires. If not breathing, begin artificial respiration, preferably mouth-to-mouth. If no detectable pulse, begin Cardio Pulmonary Resuscitation (CPR). Immediately call a physician.

General: Move to fresh air and call for medical aid.

Section 5: Fire Fighting Measures

Welding consumables applicable to this sheet as shipped are non reactive, non-flammable, 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 welding process. Wear self-contained breathing apparatus as fumes or vapours may be harmful. See American National Standard (ANSI) Z49.1 for further general safety information on the use and handling of welding consumables and associated procedures.

Section 6: Accidental Release Measures

Procedure for cleanup of spills or leaks: Not applicable. Solid objects can be picked up and placed into a container. Do not allow to enter surface, sewers or ground water. Wear proper personal protective equipment while handling.

Section 7: Handling and Storage

Handling: Handle with care to avoid stings and cuts. Hold the welding wire manually when loosening the wire. Wear gloves when handling welding consumables. Wash hands / shower before breaks and end of work. Avoid exposure to dust. Local exhaust ventilation of the working area. Some individuals can develop an allergic reaction to certain materials. Retain all warning and identity labels.

Storage: Keep separate from chemical substances like acids and strong bases, which could cause chemical reactions. Avoid humidity and temperature shocks. Store welding consumables inside a room without humidity. Do not store welding consumables directly on the ground or beside a wall. Storage temperature $21^{\circ}\text{C} \pm 2^{\circ}\text{C}$, Relative humidity max. % 60.

Because of any reason if protective nylon of the packing was torn or pierced and it won't be used, immediately the packing should repacked.

Section 8: Exposure Controls / Personal Protection

INGREDIENT	CAS NO.	EINECS NO.	OSHA EPL	ACGIH TLV 8-hour TWA
Carbon	7440-44-0 (1333-86-4 carbon black)	231-153-3	3,5 (as carbon black)	3,5 (as carbon black)
Iron + (as Iron Oxide Fume)	7439-89-6	231-096-4	10	5*
Manganese# (compounds and fume as Mn)	7439-96-5	231-105-1	5** (Fume) 1, 3	0.2* 0.1 mg/m ³ (IHL) (for elemental and

			STEL ***	inorganic compounds)
Silicon+	7440-21-3	231-130-8	15 (total dust)-5*	-
Copper	7440-50-8	231-159-6	0.2 (fume) 1 (dust and mists)	0.1 (fume) 1 (dust and mist)
CHROMIUM	7440-47-3	231-157-5	1 (Metal) 0.005 9 Cr VI Cpnds	0.5 (Metal) {A4} 0.05 (Cr VI Sol Cpnds) {A1} 0.01 (Cr VI Sol Cpnds) {A1}
MOLYBDENUM	7439-98-7	231-107-2	5 (Soluble comp) 15 (Insoluble comp. total dust)	5 (Soluble comp) 10 (insoluble comp)

*-Respirable Fraction- IHL- inhalable - **-Ceiling Limit ***- Short Term. Exposure Limit #-Reportable material under Section 313 of SARA ##-Reportable material under SARA 313 only in fibrous form. +-As a nuisance particulate covered under "Particulates Not Otherwise Regulated" by OSHA or "Particulates Not Otherwise Classified" by ACGIH. {A1} -Confirmed Human Carcinogen per ACGIH.

{A4}- Not Classifiable as a Human Carcinogen per ACGIH. {A5}-Not Suspected as a Human Carcinogen per ACGIH 1999 ACGIH listed under Notice of Intended Changes. Limits of 10 mg/m³ (inhalable fraction) and 3 mg/m³ (respirable fraction) for elemental/metal and insoluble compounds and 0.5 mg/m³ (respirable fraction) for soluble compounds are proposed and should be considered as trial limits. A3 - "Confirmed Animal Carcinogen"

1999 ACGIH listed under Notice of Intended Changes. A2 - "Suspected Human Carcinogen" Limits of 0.05 mg/m³ (respirable fraction) are proposed and should be considered as trial limits.

The exposure limit for welding fume has been established at 5 mg/m³ 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.

VENTILATION: Use enough ventilation, local exhaust at the arc, or both to keep the fumes and gases below PEL/TLV's in 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 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 the recommended exposure limit.	
HAND PROTECTION: Wear heat protecting gloves (Non-flammable). For hygiene wash hands before breaks and end of work.	
EYE PROTECTION: Wear helmet or use face shield with filter lens. As a rule of thumb begin with Shade Number 14. Adjust if needed by selecting the next lighter and/or darker shade number. Provide protective screens and flash goggles, if necessary, to shield others.	

PROTECTIVE CLOTHING: Wear hand, head and body protection which help to prevent injury from radiation, sparks and electrical shock. See 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 non-synthetic clothing. Train the welder not to touch live electrical parts and to insulate himself from work and ground.



SPECIAL PRECAUTIONS (IMPORTANT): Maintain exposure below the PEL/TLV. Use industrial hygiene monitoring to ensure that your use of this material does not create exposures which exceed PEL/TLV. Always use exhaust ventilation. For hygiene, wash hands before breaks and end of work. Do not eat, drink or smoke in working areas.

Section 9: Physical and Chemical Properties

Appearance :	Circle, steel wire or rod	Density:	~7.85 g/cm ³
Colour :	Coppers colour (because of the covering)	Melting point:	1300°C / >2300°F
Odour :	Odourless	Boiling Point:	N/A
Self-igniting:	Product is not self-igniting.	pH :	N/A
Danger of explosion :	Product does not present an explosion hazard.	Solubility in Water:	Insoluble
Vapour Density (air = 1) :	N/A	Vapour Pressure (mm Hg.) :	N/A

Section 10: Stability and Reactivity

General: These products are only intended for normal welding purposes.

Stability: These products are stable under normal conditions.

Reactivity: Contact with chemical substances like acids or strong bases could cause generation of gas.

When these products are used in a welding process, hazardous fume and gas decomposition products would include those from the volatilization, reaction or oxidation of the materials listed in Section 3, plus those from the base metal and coating. All of these factors can contribute to the fume and gases generated during welding. The amount of fume varies with the welding parameters. The concentration of a given fume or gas component may decrease or increase by many times the original concentration in the electrode/wire. Also, new compounds not in the electrodes/wire may form. Hence, welding fumes and gases cannot be classified simply.

Reasonably expected constituents of the fume would include: Primarily - iron oxide. Secondary complex oxide of manganese and silicon. Reasonably expected gaseous products would include carbon oxides, nitrogen oxides and ozone. Air contaminants around the welding area can be affected by the welding process and influence the composition and quantity of fumes and gases produced.

Refer to applicable national exposure limits for fume compounds, including those exposure Manganese also have low exposure limits, in some countries that may be easily exceeded.

Section 11: Toxicological Information

WELDING FUMES - Welding fumes must be considered as carcinogens. The International Agency for Research on Cancer (IARC) has classified welding fumes as possibly carcinogenic to humans (Group 2B). Acute exposure can result in discomfort such as dizziness, nausea or dryness or irritation of nose, throat or eyes. Chronic exposure can result in respiratory effects such as coughing, wheezing. Excess levels may cause bronchial asthma, lung fibrosis, pneumoconiosis or "siderosis".

IRON, IRON OXIDE FUMES – Acute exposure to the eyes may result in mild conjunctivitis. Overexposure 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 (Fe₃O₄) are not regarded as fibrogenic materials.

MANGANESE – Can cause irritation of the eyes, skin and respiratory tract. Acute overexposure can cause 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. 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 central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait.

CHROMIUM - Chromium metal is listed as not classifiable as to carcinogenicity to humans. The metal form (chromium as it exists in this product) is of very low toxicity. Chromium (III) and Chromium (VI) compounds which may be formed during process can cause irritation of eyes, skin and respiratory tract. Chromium (III) is considerably less toxic and it is not classified as a carcinogen as chromium (VI). Chromium (VI) compounds may cause some allergic reactions in some people and cause 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.

SILICON (inert dusts) – Chronic overexposures can cause chronic bronchitis and narrowing airways.

MOLYBDENUM – Acute overexposure can cause irritation of the eyes, nose and throat. Prolonged overexposure may result in loss of appetite, weight loss, loss of muscle coordination, difficulty in breathing, general weakness and anemia.

COPPER (dust/mists) – Can cause metal fume fever, irritation of eyes, skin, mucous membranes and respiratory tract. Symptoms include sweating, chills, fever and high temperature. Chronic overexposure can cause anemia, skin abnormalities and hair discoloration.

OZONE and NITROGEN OXIDES - These gases are formed due to interactions of the arc with the surrounding air of the welding arc. Both gases can cause irritation of eyes, nose and respiratory system. And also can produce longer term lung effects such as decreased lung capacity, chronic bronchitis, and emphysema. Of particular concern with both gases is that exposure to high levels can result in acute lung effects such as delayed pulmonary edema. Effects can be delayed.

CARBON MONOXIDE and CARBON DIOXIDE - Carbon monoxide (CO) is a chemical asphyxiant and its toxicity is due to its affinity for oxygen carrying blood hemoglobin causing fatigue, weakness, dizziness and eventual unconsciousness and possible death. Carbon dioxide (CO₂) is mainly an asphyxiant but can exert some toxic properties by increasing pulse and heart rate. These gases are mainly formed through decomposition of some electrodes' components (cellulose and carbonates).

Section 12: Ecological Information

Welding consumables and materials could degrade/weather into components originating from the consumables or from the materials used in the welding process. Avoid exposure to conditions that could lead to accumulation in soils or groundwater.

Section 13: Disposal Considerations

WASTE DISPOSAL: Disposal must be made according to official regulations. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with Federal State and local regulations. Use recycling procedures for material if available.

Section 14: Transportation Information

No international regulations or restrictions are applicable. No special precautions are necessary.

Section 15: Regulatory Information

Welding electrodes/wires which are mentioned in this SDS do not require labelling under current chemical product classification and labelling regulations. Welding electrodes and wires are non-hazardous solids at ambient temperature.

There is no risk of product phase. It may constitute risk during use!!!

Warning text on label:

ATTENTION!

Please read this label carefully. Protect yourself and others.

Take necessary precautions while welding. Obey working safety rules.

Use proper ventilation and absorption system to remove fumes and gases during welding.

Welding arc and hot welds can cause burn injuries and start fires.

Arc rays may injure your eyes and body. Use protector to eyes, body and ears.

Electrical shock can kill. Don't touch with naked hands to piece having electrical current.

Investigate working safety books relevant with this topic.

Read and understand the manufacturer's instructions and the precautionary label on the product.

Observe any federal and local regulations.

Section 16: Other Information

In this publication, reference is made to the (EC) No. 1907/2006 REACH, Annex I of Directive 67/548/EEC and Directive 1999/45/EC, (EC) No. 1272/2008 [CLP] and American National Standard Z49.1, 'Safety in Welding and Cutting' published by the American Welding Society, P.O Box 051040. Miami, FL 33135 and OSHA Publication 2206 (29 CFR 1910) from the U.S. Government Printing Office, Washington, D.C. 2040. Copies are available from the indicated sources. Also, Suppliers' Safety Data Sheets on component is used for as reference.

This Safety Data Sheet has been revised due to new format. Contact TECHNIWELD at www.Techniweldusa.com or if you have questions about this SDS.

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