BOHLER THYSSEN WELDING USA, INC.
MATERIAL SAFETY DATA SHEET

May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Standard must be consulted for specific requirements, see Referenced Standards in Detailed Explanation.

SECTION I IDENTITY

Product: UTP OA2020 AWS or other spec Product Type: Flux Cored Arc Welding Electrode
Manufacturer/Distributor Name: **BOHLER THYSSEN WELDING USA, INC.** Address: **10401 GREENBOUGH STAFFORD, TEXAS 77477**
Telephone Number: (281) 499-1212 **1-800-527-0791** Date Prepared: **REVISED 06/98**

SECTION II HAZARDOUS INGREDIENTS/COMPONENTS

Chemical Identity	CAS	OSHA PEL(mg/m^3)	ACGIH TLV(mg/m^3)	PERCENT
CARBON	7440-44-0	TWA-5-Respirable 15-Total	TWA-10-Inhalable 3-Respirable	0.50%
CHROMIUM	7440-47-3	TWA-1	TWA-0.05	8.50%
IRON	7439-89-6	TWA-10	TWA-5	BALANCE
MANGANESE	7439-96-5	5 CEILING	TWA-0.2	2.52%
MOLYBDENUM	7439-98-7	TWA-15	TWA-10	0.61%
SILICON	7440-21-3	TWA-5-Respirable TWA-15-Total	TWA-10	0.80%
VANADIUM	7440-62-2	TWA-0.1 Fume TWA-0.5 Resp. Dust	TWA-0.05-Respirable Dust As V205	0.30%

***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**. The term "hazardous" in "Hazardous Materials" should be interpreted as a term required and defined in OSHA 2265 (29 CFR 1910.1200) and does not necessarily imply the existence of any hazard.

SECTION III PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point: N/A Specific Gravity(H_2O=1): N/A Vapor Pressure(mmHg.): N/A Melting Point: N/A
Vapor Density (AIR-1): N/A Evaporation Rate: N/A Solubility in Water: N/A
Appearance and Odor: Tubular Welding Wire

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point(Method Used): N/A Flammable Limits N/A LEL-N/A UEL-N/A Extinguishing Media: N/A
Special Fire Fighting Procedures: N/A Unusual Fire and Explosion Hazards: N/A
See Section IV in Detailed Explanation

SECTION V REACTIVITY DATA

Stability: Unstable N/A Stable N/A Conditions to avoid N/A Incompatibility (Materials to avoid): N/A
Hazardous Decomposition or Byproducts: See Section V in Detailed Explanation
Hazardous Polymerization May occur N/A Will not occur N/A Conditions to avoid N/A

SECTION VI HEALTH HAZARD DATA

Route(s) of entry: Inhalation? ** Skin? Unlikely Ingestion? Unlikely
**** Gases and fumes generated while welding may be dangerous to your health.** See Section VI in Detailed Explanation
Welding Fumes May Result in Discomfort Such as Dizziness, Nausea or Dryness or Irritation of Nose, Throat, or Eyes.
Carcinogenicity: Chromium X (See Section VI in Detailed Explanation) Nickel X (See Section VI in Detailed Explanation)
Signs and Symptoms of Over Exposure:
Short-term (acute): See Section VI in Detailed Explanation
Long-term (chronic): See Section VI in Detailed Explanation
Emergency and First Aid Procedures: In Case of Fume Inhalation Remove to Fresh Air. Employ First Aid Techniques Recommended by the American Red Cross. In an Emergency Call Physician.
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 Sec. 25249.5 et. seq.)

SECTION VII 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 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: Cool and Dry Storage
Other Precautions: When Welding, Brazing, or Soldering: Welding Arc or Torch Flame May Be a Source of Ignition of Combustible Product.

SECTION VIII CONTROL MEASURES

Respiratory Protection (specify type): See Section VIII in Detailed Explanation
Ventilation: Local Exhaust required in semi-open or poorly ventilated space. See Section VIII in Detailed Explanation
Protective Gloves: See Section VIII in Detailed Explanation
Other Protective Clothing or Equipment: See Section VIII in Detailed Explanation
Work/Hygienic Practices: See Section VIII in Detailed Explanation

The information in this MSDS was obtained from sources we believe are reliable. However, this information is provided without any representation of warranty, expressed or implied, regarding accuracy or correctness.

REFERENCED STANDARDS

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

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 Subpart Z	Toxic and Hazardous Substances
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 1910.1200	Material Safety Data Sheet (Non-Mandatory Form)

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 Biological Exposure Indices (BEIs)

SECTION IV FIRE AND EXPLOSION HAZARD DATA
IMPORTANT! (Non Flammable) Welding arc and sparks can ignite combustibles and flammables. Refer to American National Standard Z49.1 for fire prevention and protection information during the use of welding and allied procedures.

SECTION V 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 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 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/m^3 will result in a significant reduction from the 5 mg/m^3 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/m^3 which will result in a significant reduction from the 5 mg/m^3 general welding fume (NOC) level. The limit of 0.05 mg/m^3 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 CrO^{3-} which calculates to 0.05 mg of Cr^{+6}/m^3. 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

SECTION VI HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: The ACGIH recommended general limit for welding fume NOC- (not otherwise classified) is 5 mg/m^3. ACGIH-1995 (or latest date) preface states, "These values are not fine lines between safe and dangerous concentrations and should not be used by anyone untrained in the discipline of industrial hygiene." See **SECTION V** for specific fume constituents which may modify the TLV.

EFFECTS OF OVER EXPOSURE:

WARNING: PROTECT yourself and others. Read and understand this information.

FUMES AND GASES can be dangerous to your health.

Short-term (acute) 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.

Long-term (chronic) 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.

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.

SECTION IX: DOCUMENTARY INFORMATION

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

The information in this document is believed to be correct as of the date of issuance. However, **NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED, OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THIS INFORMATION, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION, OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE.**

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