



## SAFETY DATA SHEET

MAY BE USED TO COMPLY WITH OSHA'S HAZARD COMMUNICATION STANDARD, 29 CFR 1910.1200 AND SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) OF 1986 PUBLIC LAW 99-499. STANDARD SHOULD BE CONSULTED FOR SPECIFIC REQUIREMENTS.

### SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

**NAME OF PRODUCT:** US FORGE - Bare and Flux Coated Low Fuming Bronze Rod  
**SYNONYMS:** US FORGE LFB  
**PRODUCT CODES:** Bare: 02303, 02322, 02323, 02332, 02333  
Flux coated: 02203, 02222, 02223, 02232, 02233

**MANUFACTURER/  
SUPPLIER:** US FORGE  
N94 W14355 GARWIN MACE DRIVE  
MENOMONEE FALLS, WI 53051 USA

**TELEPHONE NUMBER** (262) 255-5157 or Toll Free (800) 343-3758  
**FAX NUMBER:** (262) 255-2374  
**US FORGE WEBSITE:** [www.us-forge.com](http://www.us-forge.com)

**PRODUCT CLASSIFICATION:** Bare Brazing Rod (requires use US Forge 02350 brazing flux)  
Flux Coated Brazing Rod (no flux required)

### SECTION 2: HAZARDS IDENTIFICATION

**EMERGENCY OVERVIEW:** Chemically stable and inert. Does not pose a fire hazard as shipped. **Non-Flammable:** Flames used for brazing can ignite combustibles. Refer to American National Standard Z49.1 for fire prevention during welding. In case of fire, use NIOSH/MSHA self contained breathing apparatus.

**ROUTES OF ENTRY:** Primary route of entry is the respiratory system. Other possible routes are eyes and/or skin contact.

#### POTENTIAL HEALTH EFFECTS:

**EYES:** Inert foreign body hazard only.  
**SKIN:** Rashes/irritations due to drying of the skin and/or mechanical abrasion related to skin-to-clothing contact or skin-to-skin contact. Spatter and flames from brazing may cause burns.  
**INGESTION:** Not an expected route of entry, but if ingested product could cause serious injury.  
**INHALATION:** Danger of serious damage to health by prolonged exposure through inhalation.

**WARNING:** This product contains or produces a chemical known to the State of California to cause birth defects (or other reproductive harm) and/or cancer. (California Health & Safety Code 25249.5 et seq.).

**WARNING:** avoid breathing welding fumes and gases; they may dangerous to your health. Always use adequate ventilation and use appropriate personal protection equipment.

#### CARCINOGENICITY

**WELDING FUMES** (not otherwise specified) are considered to be carcinogenic defined with no further categorization by NIOSH and IARC.

**MANGANESE** is listed by ACGIH as Group A4: Not classifiable as a human carcinogen.

Although this product does not require a hazard warning label in all countries, we recommend that the safety advice should be observed:

**Pictograms:** GHS07- GHS08 (flux coated rods)



Boric acid  
Anhydrous Borax (Borax Decahydrate)

**Hazard categories**

Reproductive toxicity: Repr. Cat. 2

Hazard Statements:

May damage fertility. May damage the unborn child.

**Safety Advice**

S53 Avoid exposure - obtain special instructions before use.

S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

**Hazard statements**

H360FD May damage fertility. May damage the unborn child.

**Precautionary statements**

P285 In case of inadequate ventilation wear respiratory protection.

P314 Get medical advice/attention if you feel unwell.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P202 Do not handle until all safety precautions have been read and understood.

P260 Do not breathe dust/fume/gas/mist/vapors/spray.

P501 Dispose of contents/container to waste treatment facility in accordance with local and national regulations.

Before using this product, contact your doctor to determine if exposure to product or use of this product will aggravate your medical conditions. Spatter and flames from brazing may cause burns and start fires.

**SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS**

**IMPORTANT:** This section covers the materials from which these products are manufactured. Any of the chemicals or compounds subject to reporting under Title III, in Section 313, of the Superfund Amendments and Reauthorization Act (SARA) are marked by the symbol #.

**Exposure Limit (mg/m<sup>3</sup>)**

<u>INGREDIENTS</u>	<u>CAS NUMBER</u>	<u>OSHA PEL</u>	<u>ACGIH-TLV</u>	<u>Percent Ingredients (by weight)</u>
<b><u>ALLOY</u></b>				
Copper #	7440-50-8	0.1	0.2	40 – 70
Zinc #	7440-66-6	5	Not listed	Balance
Manganese #	7440-96-5	5 (ceiling)	0.1	0.1 - 1.0
Iron	7439-89-6	10	5	0.1 - 1.1
<b><u>FLUX (if flux coated)</u></b>				
Boric acid	10043-35-3	5	10	50 – 80
Anhydrous Borax (borax decahydrate)	1303-96-4	Not listed	1	10 – 30

Remaining ingredients non hazardous binder

The balance of ingredients in the flux coating are proprietary and claimed as trade secret.

**CAS / EINECS NUMBER / HAZARD CLASSIFICATION FOR ABOVE INGREDIENTS**

<u>INGREDIENTS</u>	<u>CAS NUMBER</u>	<u>EINECS NUMBER</u>	<u>Hazard Classification per ECD 67/548/EEC</u>
<u>ALLOY</u>			
Copper #	7440-50-8	231-159-6	No
Zinc #	7440-66-6	231-175-3	No (Zinc is in solid form)
Manganese #	7440-96-5	231-105-1	No
Iron	7439-89-6	231-096-4	No
<u>FLUX (if flux coated)</u>			
Boric Acid	10043-35-3	233-139-2	Boric acid C ≥ 5.5 % Repr.Cat. 2; R60-61
Anhydrous Borax (borax decahydrate)	1303-96-4	215-540-4	C ≥ 8.5 % Repr. Cat. 2; R60-61

Exposure limits are subject to change. Contact ACGIH and OSHA for current values. See Section 16 for European Council Directive 67/548/EEC R-phrases

**SECTION 4: FIRST AID MEASURES**

**EMERGENCY & FIRST AID PROCEDURES:** Call for medical aid and inform them of the ingredients from Section 3. Employ first aid techniques recommended by The American Red Cross.

**EYES:** Flush with a large amount of fresh water for at least 15 minutes. Get medical attention.

**SKIN:** Wash affected area with soap and water to remove dust or particles. If rash develops, see a physician. Get medical attention for irritations that persist.

**INGESTION:** Seek medical attention immediately.

**INHALATION:** Remove to fresh air. If breathing is difficult administer oxygen. If breathing has stopped, begin artificial respiration and obtain medical assistance immediately.

**GENERAL:** Move to fresh air and call for medical aid.

**SECTION 5: FIRE FIGHTING MEASURES**

**Non-Flammable** These products as shipped are non-hazardous, nonflammable, non-explosive, and non-reactive. In case of fire, Use NIOSH/MSHA self contained breathing apparatus.

**NFPA HAZARD CLASSIFICATION:**

Health: 2                      Flammability: 0                      Reactivity: 0

Other: In case of fire, use NIOSH/MSHA self contained breathing apparatus.

**HMIS HAZARD CLASSIFICATION:**

Health: 2                      Flammability: 0                      Reactivity: 0

Protection: In case of fire, use NIOSH/MSHA self contained breathing apparatus.

**EXTINGUISHING MEDIA:** water, dry chemical extinguisher, foam, Halon, CO<sub>2</sub>

**SPECIAL FIRE FIGHTING PROCEDURES:** Low pressure extinguisher. In case of fire, use NIOSH/MSHA self contained breathing apparatus.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** None

**HAZARDOUS DECOMPOSITION PRODUCTS:** Toxic oxides are emitted when heated above the melting point. Flux coated rods: emits oxides of boron when heated to decomposition.

**HAZARDOUS POLYMERIZATION:** Will not occur.

**SECTION 6: ACCIDENTAL RELEASE MEASURES**

**ACCIDENTAL RELEASE MEASURES:** Shovel into a suitable container for proper disposal.

**PERSONAL PRECAUTIONS:** Wear gloves when prolonged contact with skin is likely.

**ENVIRONMENTAL PRECAUTIONS:** Do not flush residue into waterways.

**SECTION 7: HANDLING AND STORAGE**

**HANDLING:** Avoid exposure to dust, do not ingest and avoid contact with eyes. Some individuals can develop an allergic reaction to certain materials. Do not eat, drink, or smoke when using this product. Wash thoroughly after using this product.

**STORAGE:** Keep material sealed and dry before use and do not remove product identification label or warning label. After using, keep remaining product sealed and dry and do not remove product identification label or warning label.

**SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION**



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

**ENGINEERING CONTROLS:** Proper ventilation **must** be maintained.

**VENTILATION:** Use enough ventilation, local exhaust at the work area, or both, to keep the fumes and gases below the TLV's in the workers breathing and the general area. Train the worker to keep his head out of the fumes. Monitor fume levels and do not exceed permissible exposure limits or values.

**RESPIRATORY PROTECTION:** Do NOT breathe fumes. Use respirable fume respirator or air supplied respirator when brazing in a confined space or where local exhaust or ventilation does not keep exposure below the TLV's.

**EYE PROTECTION:** Wear appropriate brazing glasses with side shield. Do not wear contact lenses.

**PROTECTIVE CLOTHING:** Wear gloves when using or prolonged contact with skin or repeated contact with skin is likely. Wear hand and body protection to prevent injury. Professionally wash contaminated clothing before re-use. See ANSI Z49.1.

**SKIN PROTECTION:** Individuals having sensitive skin may find it beneficial to use a barrier cream or moisturizer when excessive or prolonged contact with skin is likely, along with rubber gloves. Wash thoroughly after handling to remove all residue.

**WORK HYGIENIC PRACTICES:** Food and drink should not be consumed or tobacco products used, nor cosmetics applied in area where dust exposures are possible.

**OTHER PROTECTIVE EQUIPMENT:** Full protective equipment normally used in soldering / brazing operation so as to prevent any contact. Review operations to avoid contact with hazardous gas, liquid, or solid. See also:

29CFR 1910.132 - 29 CFR 1910.140 Personal Protective Equipment  
29 CFR 1910.251 - 29 CFR 1910.257 Welding, Cutting and Brazing

**EXPOSURE GUIDELINES:** Use industrial hygiene monitoring equipment to ensure that exposure does not exceed applicable national exposure limits.

**EFFECTS OF OVEREXPOSURE** - brazing may create one or more of the following health hazards:

**FUMES AND GASES** can be dangerous to your health.

**PRIMARY ROUTES OF ENTRY** are the respiratory system. Other possible routes are eyes and/or skin contact.

**PREEXISTING** respiratory or allergic conditions may be aggravated in some individuals (i.e. asthma, emphysema).

Brazing fumes cannot be classified simply. The composition and quantity of both are dependent upon the metal being brazed, the process, procedure, and the rod 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 brazed (such as paint, plating, or galvanizing), the volume of the work area, the quality and the amount of ventilation, position of the worker'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 material is consumed, fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section 3. Fume and decomposition products, not the ingredients in the rod, are important. Decomposition products include those originating from the volatilization, reaction, or oxidation of materials in Section 3, plus those from the base metal and coating, etc., as noted above. These components are virtually always present as complex oxides and not as metals (Characterization of Arc Welding Fume: American Welding Society). The following limits can be used as guidance. Refer to Section 11 for more information about welding fumes.

<b><u>SUBSTANCE</u></b>	<b><u>CAS NUMBER</u></b>	<b>Exposure Limit (mg/m<sup>3</sup>)</b>	
		<b><u>OSHA PEL</u></b>	<b><u>ACGIH-TLV</u></b>
Iron Oxide	1309-37-1	10 (as Fe)	5 (as Fe)
Nitric Oxide	10102-43-9	30	31
Manganese fume #	7439-96-5	5	0.02
Copper # (as Cu)	7440-50-8	0.1 (as fume)	0.2 (as fume)

**MONITOR FUME LEVELS.** One recommended way to determine the composition and quantity of fumes and gas to which workers are exposed is to take an air sample in the worker's breathing zone (see ANSI/AWS F1.1, F1.2, F1.3, F1.4, and F1.5, available from the "American Welding Society," 550 N.W. LeJeune Road, Miami, FL 33126).

Gaseous reaction products may include carbon monoxide and carbon dioxide.

## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

**Appearance:** bare solid rod or flux coated rod

**Boiling point:** not applicable

**Specific Gravity@ 20 °C (Water =1):** 8.0-8.5

**pH-Value:** not applicable

**Flash point:** not determined

## SECTION 10: STABILITY AND REACTIVITY

**GENERAL:** These items are only intended for brazing application.

**STABILITY:** Product is chemically stable and non-reactive.

**INCOMPATIBILITY / CONDITIONS TO AVOID:** Keep product away from high heat and moisture.

**MATERIALS TO AVOID:** Strong acids, strong oxidizers, some halogenated compounds.

**HAZARDOUS POLYMERIZATION:** Will not occur.

**REACTIVITY:** None.

**HAZARDOUS DECOMPOSITION OR BY-PRODUCTS:** Metallic oxides. Fumes can be dangerous to your health. See Section 11

In other countries the exposure limits listed in Section 3 may be different and the appropriate country standards should be used.

<b>SECTION 11: TOXICOLOGICAL INFORMATION</b>
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**Threshold Limit Value:** The ACGIH recommended general limit for welding fume NOS (not otherwise specified) is 5 mg/m<sup>3</sup>. The ACGIH 1999 preface states: "The TLV-TWA should be used as guides in the control of health hazards and should not be used as firm lines between safe and dangerous concentrations." See Section 8 for specific fume constituents that may modify the TLV. Brazing/welding vapours and fumes from brazing/welding may cause metal fume fever. Symptoms can appear 4 to 12 hours after. (headache, dizziness, dryness, cough, nausea and fever).

**SHORT TERM (ACUTE) OVEREXPOSURE:** FUMES AND GASES can be dangerous to your health. Primary routes of entry are the respiratory system, eyes, ingestion, and/or skin. Preexisting respiratory or allergic conditions may be aggravated in some individuals. Brazing/welding vapors and fumes from brazing/welding may cause metal fumes fever. Symptoms can appear 4 to 12 hours after (headache, dizziness, dryness, cough, nausea and fever) May cause irritation of respiratory tract. Repeated or prolonged exposure may cause irritation of eyes and skin. Fumes may result in discomfort such as sneezing, and coughing, and should be considered as an irritant to the respiratory system. Existing lung disorders may be aggravated. If swallowed, nausea, vomiting, and diarrhea may result. Skin contact may result in mild dermatitis or irritation, with existing skin disorders possibly being aggravated. Upon eye contact, mild irritation to eye surfaces may result, and existing eye disorders possibly being aggravated. **IRON, IRON OXIDE, MANGANESE** - Remove from overexposure and apply artificial respiration if needed. Individuals with Wilson's Disease are at increased risk of COPPER poisoning. Overexposure to fumes may result in discomfort such as dizziness, nausea, or dryness or irritation of nose, throat, or eyes. **EYE CONTACT** causes irritation and may cause burns. **SKIN CONTACT** may cause irritation and possibly fluoride burns which may not be immediately painful or evident, especially on prolonged contact. This material may be absorbed through the skin resulting in systemic poisoning. Symptoms of poisoning are similar to those that occur with ingestion. **INHALATION** may cause respiratory tract and mucous membrane irritation. Copper and zinc fumes produce **METAL FUME FEVER** which may result in severe tracheobronchitis, pneumonitis, pulmonary edema (throat dryness, cough, headache, vomiting, chest pains, and chills). Typically metal fume fever begins four to twelve hours after sufficient exposure to freshly formed fumes. First symptoms are a metallic taste, dryness, and irritation of the throat. Cough and shortness of breath may occur along with a headache, fatigue, nausea, vomiting, diarrhea, and painful spasms of the limbs. Copper poisoning can result in hemolytic anemia and kidney, liver, and spleen damage. **TIN & TIN COMPOUNDS** – can affect the body if inhaled or if they make contact with eyes or skin. Short term overexposure toxicity is low.

**LONG TERM (CHRONIC EXPOSURE):** May result in coughing, erythema, and nausea. Boric acid can accumulate in the body (brain, bone) with repeated exposure. Prolonged or repeated skin contact may cause dermatitis. May cause borism characterized by dry skin, skin eruptions, and gastric disturbances. If absorbed through skin it may affect behavior, sense organs, metabolism, the gastrointestinal tract, and the respiratory tract (respiratory depression). Prolonged absorption of **BORON COMPOUNDS** may cause mild gastrointestinal irritation, loss of appetite, nausea, and erythematous rash. Dryness of skin and mucous membranes, loss of hair, conjunctivitis, and kidney injury have also been observed. Reproductive effects have been observed in laboratory animals. Primary route of entry is the respiratory system. **IRON, IRON OXIDE** - Long term overexposure to iron fumes can cause deposits of iron in the lungs (siderosis). Lungs will clear in time when exposure to iron and its compounds cease. **MANGANESE** - Long term exposure may lead to "Manganism." Central nervous system is affected and symptoms include muscular weakness, impaired speech, impaired movement, and tremors. Exposed workers should get quarterly medical examinations for manganism. Bronchitis and some lung fibrosis have been reported. **TIN & TIN COMPOUNDS** – Long term overexposure affects are not known.

**Avoid direct inhalation of fumes during heating and use. Monitor fume levels.**

<b>SECTION 12: ECOLOGICAL INFORMATION</b>
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**MATERIAL:** Welding consumables and materials can degrade into the components used to manufacture the product. Avoid exposure to conditions that could lead to accumulation in soils and groundwater.

**CONTAMINATED PACKAGING:** Empty containers should be taken for local recycling, recovery, or waste disposal. Metals may be recycled.

**SECTION 13: DISPOSAL CONSIDERATION**

**WASTE DISPOSAL METHOD:** Dispose of any rod and waste residues in accordance with EPA or local regulations.

Review U.S. Federal Hazardous Waste Regulations §40 CFR261 to determine if this is hazardous in USA. Please be advised that state and local requirements, or other country requirements, for waste disposal may be more restrictive or otherwise different than U.S. Federal regulations. It is not possible to give this product a waste code number according to the European waste catalogue because only the intended use of the user consents the assignment of a specific code number.

**SECTION 14: TRANSPORTATION INFORMATION**

**DOMESTIC TRANSPORT REGULATIONS (USA):** DOT - not regulated.

**DOMESTIC TRANSPORT REGULATIONS (CANADA):** TDG - not regulated.

**DOMESTIC TRANSPORT REGULATIONS (MEXICO):** MEX - not regulated.

**INTERNATIONAL TRANSPORT REGULATIONS:**

ICAO – not regulated

IATA – not regulated

IMDG / IMO – not regulated

**OTHER AGENCIES:** No international regulations or restrictions are applicable.

Handle with care to avoid damaging the product. Do not remove product identification label or warning label. Keep material away from heat. Do not store near food materials.

**SECTION 15: REGULATORY INFORMATION**

**Read and understand the manufacturer's Safety Data Sheet before handling or disposing of this product.**

**U.S. EPA TSCA (TOXIC SUBSTANCE CONTROL ACT):** All constituents of these products are on the TSCA inventory list or are excluded from listing.

Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center and to our Local Emergency Planning Committee.

**EPCRA/SARA TITLE III 313 TOXIC CHEMICALS:**

The following metallic components are listed as SARA 313 "TOXIC CHEMICALS" and are potentially subject to annual SARA 313 reporting. See Section 3 if the ingredient is present and for percent.

<u>INGREDIENT NAME</u>	<u>CAS NUMBER</u>	<u>DISCLOSURE THRESHOLD</u>
Chromium & chromium compounds	7440-47-3	1.0 % de minimis concentration
Chromium VI	Not listed	0.1 % de minimis concentration
Barium compounds	Not listed	1.0 % de minimis concentration
Cobalt	7440-48-4	0.1 % de minimis concentration
Copper	7440-50-8	1.0 % de minimis concentration
Manganese	7439-96-5	1.0 % de minimis concentration
Nickel	7440-02-0	0.1 % de minimis concentration
Aluminum (fume or dust)	7429-90-5	1.0 % de minimis concentration
Silver	7440-22-4	1.0 % de minimis concentration

**Package Labeling:**

Additional advice on labeling

As a finished article the product does not need to be labeled in accordance with EC-directives or respective national laws.

International rules may vary and the appropriate regulations should be followed as defined by the country where the product is used.

**SECTION 16: OTHER INFORMATION**

This Safety Data Sheet has been revised due to modifications to several paragraphs and/or new format.  
Prepared by US Forge, USA.

See American National Standard Z49.1, Safety in Welding and Cutting, published by the "American Welding Society," 550 N.W. LeJeune Road, Miami, FL 33126 and OSHA Publication 2206 (29CFR 1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 for more detail on safe use of product.

R-phrases & S-phrases

**Boric acid C ≥ 5,5 % & Anhydrous Borax (borax decahydrate)**

R60 : May impair fertility.

R61 : May cause harm to the unborn child.

S53 : Avoid exposure - obtain special instructions before use.

**SUPPLEMENTAL INFORMATION – DEFINITIONS:**

IARC: International Agency for the Research on Cancer

NIOSH: National Institute for Occupational Safety and Health

OSHA: U.S. Occupational Safety and Health Administration

ACGIH: American Conference of Governmental Industrial Hygienists

CAS: Chemical Abstracts Service Registry Number

EINECS: European Inventory of Existing Chemical Substances

PEL: Permissible Exposure Limit

NTP: National Toxicology Program

TLV: Threshold Limit Value

ECD: European Council Directive

GHS: Globally Harmonized System

The information in this SDS was obtained from sources we believe are reliable. However, this information is provided without any representation or warranty, expressed or implied, regarding accuracy or correctness. The conditions or methods of handling, storage, use, and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons we do not assume responsibility and expressly disclaim liability of loss, damage, or expense arising from it or any way connected with the handling, storage, use, or disposal of the product.