



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 – Hardfacing Electrode
PART NUMBERS: 54732, 54733

**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

PRODUCT CLASSIFICATION: Covered Electrode for Shielded Metal Arc Welding (SMAW)

SECTION 2: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Welding electrodes are not normally considered hazardous as shipped or when handled. Gloves should be worn when handling to prevent cuts. Avoid inhalation of dust from these products. Skin contact may cause possible allergic reactions. Persons with a pacemaker should not go near welding or cutting operations until they have consulted their doctor and obtained information from the manufacturer of the pacemaker device. When this product is used in a welding process the most important hazards are: heat, radiation, electric shock, and welding fumes.

ROUTES OF ENTRY:

Primary route of entry is the respiratory system. Other possible routes are eyes and/or skin contact.

POTENTIAL HEALTH EFFECTS:

EYES: RADIATION: Arc rays from welding can injure eyes. HEAT and MOLTEN METAL can severely damage eyes.

SKIN: HEAT: Spatter and molten metal can cause burn injuries
ELECTRICITY: **Electric shock can kill!**
RADIATION from the arc: Skin cancer has been reported.

INGESTION: Not an expected route of entry, but if ingested product could cause serious injury.

INHALATION: FUMES: Overexposure to welding fumes may result in symptoms like metal fume fever, dizziness, nausea, dryness of the nose, throat or eyes.

ACUTE HEALTH HAZARDS: See Section 11

CHRONIC HEALTH HAZARDS: See Section 11

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: Nothing found.

WARNING: This product contains or produces a chemical known to the State of California to cause birth defects (or other reproductive harm) and 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:

CHROMIUM - Chromium VI is listed as being carcinogenic to humans on **IARC** and **NTP** lists, and is listed by **NIOSH** as being a potential occupational carcinogen (with no further categorization).

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

TITANIUM DIOXIDE is listed as being unclassifiable as to Carcinogenicity in humans by **IARC** and is listed by **NIOSH** as being a potential occupational carcinogen (with no further categorization).

SILICON DIOXIDE - is listed as being carcinogenic to humans on **IARC** and **NTP** lists, and is listed by **NIOSH** as being a potential occupational carcinogen (with no further categorization).

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

GHS classification: not applicable

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.

ADDITIONAL LABELING INFORMATION

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

Metals in massive form, alloys, mixtures containing polymers and mixtures containing elastomers do not require a label according to this Annex (Annex I GHS), if they do not present a hazard to human health by inhalation, ingestion or contact with skin or to the aquatic environment in the form in which they are placed on the market, although classified as hazardous in accordance with the criteria of this Annex.

Instead, the supplier shall provide the information to downstream users or distributors by means of the SDS.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

IMPORTANT: This section covers the materials from which these products are manufactured. The fumes and gases produced during normal use of these products are covered in Section 8. 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 #.

INGREDIENTS	CAS NUMBER	Exposure Limit (mg/m³)		Percent Ingredients (by weight)
		OSHA PEL	ACGIH-TLV	
Iron	7439-89-6	10 (as Fe)	5 (as Fe)	60 – 100
Titanium Dioxide	13463-67-7	15	10	7 – 13
Chromium #	7440-47-3	1	0.5	3 – 7
Calcium Carbonate	1317-65-3	5	10	1 – 5
Manganese #	7439-96-5	5 (ceiling)	0.1	1 – 5
Potassium Silicate	1312-76-1	Not listed	Not listed	1 – 5
Silicon	7440-21-3	5	10	0.1 – 1
Carbon	7440-44-0	2.5	2	0.1 – 1
Silicon Dioxide	14808-60-7	**	0.05	0.1 – 1

** 10 mg/m³ / (% SiO₂ + 2)



CAS / EINECS NUMBER / HAZARD CLASSIFICATION FOR ABOVE INGREDIENTS

INGREDIENTS	CAS NUMBER	EINECS NUMBER	Hazard Classification per ECD 67/548/EEC
Iron	7439-89-6	231-096-4	No
Titanium Dioxide	13463-67-7	236-675-5	No
Chromium #	7440-47-3	231-157-5	No
Calcium Carbonate	1317-65-3	215-279-6	No
Manganese #	7439-96-5	231-105-1	No
Potassium Silicate	1312-76-1	215-199-1	No
Silicon	7440-21-3	231-130-8	No
Carbon	7440-44-0	231-153-3	No
Silicon Dioxide	14808-60-7	238-878-4	No

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 and S-phrases if applicable.

SECTION 4: FIRST AID MEASURES

EMERGENCY & FIRST AID PROCEDURES: Call for medical aid. Employ first aid techniques recommended by The American Red Cross.

EYES: Flush with a large amount of fresh water for at least 15 minutes to remove dusts or fumes. Get medical attention. For radiation burns due to arc flash, see physician.

SKIN: Wash affected area with soap and water to remove dust or particles. If rash develops, see a physician. For skin burns from arc radiation, promptly flush with cold water. Get medical attention for burns or for irritations that persist.

INGESTION: Seek medical attention.

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

ELECTRIC SHOCK: Disconnect and turn off the power. Use a nonconductive material to pull victim away from contact with live wire parts or wires. If breathing has stopped, begin artificial respiration and obtain medical assistance immediately. If no detectable pulse, begin Cardiopulmonary Resuscitation. (CPR) and immediately call for medical aid.

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

SECTION 5: FIRE FIGHTING MEASURES

Non-Flammable: Welding arc and sparks can ignite combustibles. Refer to American National Standard Z49.1 for fire prevention during welding. These products as shipped are non-hazardous, nonflammable, non-explosive, and non-reactive.

FLAMMABLE LIMITS IN AIR (% by volume): UPPER: N/A LOWER:N/A

FLASH POINT: N/A

AUTOIGNITION TEMPERATURE: N/A

NFPA HAZARD CLASSIFICATION:

Health: 2 Flammability: 0 Reactivity: 0 Other:

RATING UNDER NATIONAL FIRE PROTECTION 704:

Health: 2 Flammability: 0 Reactivity: 0 Protection:

EXTINGUISHING MEDIA: Use the extinguishing media recommended for the burning material and fire situation.

SPECIAL FIRE FIGHTING PROCEDURES: Wear self-contained breathing apparatus as fume or vapors may be harmful.

UNUSUAL FIRE AND EXPLOSION HAZARDS: None.

HAZARDOUS DECOMPOSITION PRODUCTS: Reasonably expected fume constituents of the fume could include complex oxides of iron and manganese. Chromium oxides may also be present.

SECTION 6: ACCIDENTAL RELEASE MEASURES

ACCIDENTAL RELEASE MEASURES: Solid objects may be picked up and placed in a container. Wear protective clothing and make sure that the solid objects are at room temperature before handling.

PERSONAL PRECAUTIONS: Gloves should be worn when handling to prevent cuts.

ENVIRONMENTAL PRECAUTIONS: Do not flush residue into waterways.

SECTION 7: HANDLING AND STORAGE

HANDLING: Handle with care to avoid cuts and to keep the wire from piercing the skin. Wear gloves when handling welding consumables. Avoid exposure to dust and do not ingest. Some individuals can develop an allergic reaction to certain materials. Keep all warning labels and identification labels on the 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.

Always use adequate ventilation and wear appropriate personal protection. Do not breathe welding fumes and gases; they are dangerous to your health.

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 the following:

ENGINEERING CONTROLS: Proper ventilation must be maintained.

ARC RAYS and **SPARKS** can injure eyes and burn skin. **ELECTRIC SHOCK** can kill! Wear correct hand, eye, head, and body protection.

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

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

EYE PROTECTION: Wear a helmet or face shield with a filter lens of shade 12 or darker. Provide screens and flash goggles 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 welders' 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 themselves from work and ground, especially if clothing and gloves are wet.

WORK HYGIENIC PRACTICES: Do not eat or consume beverages in the work area.

EXPOSURE GUIDELINES: Use industrial hygiene monitoring equipment to ensure that exposure does not exceed applicable national exposure limits. When the electrode is consumed, fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section 3. The fume and decomposition products, not the ingredients in the electrode, are important. Decomposition products include those originating from the volatilization, reaction, or oxidation of materials in Section 3, plus those from the base metal, 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). Reasonably expected fume constituents of the fume could include complex oxides of iron, manganese, and chromium. The following limits can be used as guidance. Refer to Section 11 for more information about welding fumes.

<u>Substance</u>	<u>CAS NUMBER</u>	<u>Exposure Limit (mg/m³)</u>	
		<u>OSHA PEL</u>	<u>ACGIH-TLV</u>
Iron Oxide	1309-37-1	10 (as Fe)	5 (as Fe)
Nitric Oxide	10102-43-9	30	31
Chromium (VI)	not listed	0.005	0.05 (as Cr VI)
Manganese fume #	7439-96-5	5	0.02

Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may also be formed by radiation from the arc. The fume limit for Cr VI (5 micrograms/m³) may be reached before the ACGIH recommended general welding fume limit of 5 mg/m³ is reached. Monitor fume levels and Cr VI level. Train workers about the hazards of Cr (VI). **Read and comply with the OSHA permissible exposure limits for hexavalent chromium (CrVI), Fed. Reg. 71 – 10099 (specifically 29 CFR 1910.1026, 29 CFR 1915.1026, and 29 CFR 1926.1126).** For CrVI, OSHA requires: “The employer shall perform initial monitoring to determine the 8-hour TWA exposure for each employee on the basis of a sufficient number of personal breathing zone air samples to accurately characterize full shift exposure on each shift, for each job classification, in each work area”. Specialized equipment is required for monitoring Cr (VI) concentration in the workplace. OSHA Analytical Method Number ID-215 for area and breathing zone sampling and OSHA Analytical Method Number W4001 for wipe samples are listed on the OSHA website - www.osha.gov -as methods for measuring Cr(VI). This standard is complex and the employer should contact an occupational health professional for doing the Cr(VI) monitoring and all other fume monitoring.

Exposure limits are subject to change. Contact ACGIH, OSHA, NIOSH, and IARC for current values.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Solid appearance, non volatile, wire with a flux coating. No odor. Not soluble in water.

MELTING POINT: > 1800 °F (> 1000 °C)

SECTION 10: STABILITY AND REACTIVITY

GENERAL: These items are only intended for normal welding purposes.

STABILITY: Stable under normal conditions.

HAZARDOUS POLYMERIZATION: Will not occur

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

HAZARDOUS DECOMPOSITION OR BY-PRODUCTS:

Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may also be formed by radiation from the arc.

Refer to applicable national exposure limits for the fume compounds. Reasonably expected fume constituents of the fume could include complex oxides of iron, chromium, and manganese. The employer should contact an occupational health professional for doing fume monitoring to determine fumes emitted and to ensure compliance to the applicable country limits.

Manganese also has a low exposure limit listed in the USA. Other country exposure limits may be different and the appropriate country standards should be used.

SECTION 11: TOXICOLOGICAL INFORMATION
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Welding fumes cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedure, and the electrode 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 the amount of ventilation, 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). The International Agency for Research on Cancer has classified welding fumes as possibly carcinogenic to humans (group 2B).

EFFECTS OF OVEREXPOSURE - Electric arc welding 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).

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. **PRIMARY ROUTE OF ENTRY** is the respiratory system. **IRON, IRON OXIDE, MANGANESE** - Remove from overexposure and apply artificial respiration if needed. **CHROMIUM**- Inhalation of chromium can cause irritation of nasal membranes and skin. **FLUORIDES** - Fluoride compounds produced may cause eye and skin burns, and pulmonary edema bronchitis. 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 may lead to siderosis (iron deposits in lungs) and is believed by some investigators to affect pulmonary functions. **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.

FLUORIDES - Overexposure to fluorides can cause serious bone erosion, excessive calcification of the bone and calcification of the ribs, pelvis and spinal column. May cause skin rash. Long term overexposure to **HEXAVALENT CHROMIUM (CrVI)** is reported to cause lung cancer in humans.

Monitor fume levels and do not exceed permissible limits.

SECTION 12: ECOLOGICAL INFORMATION

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 grinding dust and waste residues in accordance with EPA or local regulations. Plastic materials, cardboard, and wire can be re-cycled.

U.S.A. RCRA: Some unused product may contain chromium which is considered hazardous waste if discarded, RCRA ID characteristic Toxic Hazardous Waste D007. Other ingredients in this product may be considered "hazardous material" in other countries and they may require special disposal methods. Contact your local municipality for the proper disposal method. Residues from welding consumables and processes could degrade and accumulate in groundwater. Welding slag from these products could typically contain the following components from the coating of the electrode: Fe, Mn, F, Na, Si, Ca, and C.

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 and keep product dry. Do not remove product identification label or warning label.

SECTION 15: REGULATORY INFORMATION

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

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 information. Before using this product, understand and your employer's safety practices.

U.S. FEDERAL REGULATIONS: Under the OSHA Hazard Communication Standard these products are considered as hazardous.

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

CERCLA (COMPREHENSIVE RESPONSE COMPENSATION, AND LIABILITY ACT)/SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATON ACT):

Reportable Quantities (RQ's) and/or Threshold Planning Quantities (TPQ's):

Ingredient name:	RQ (lb)	TPQ(lb)
Product is a solid solution in the form of a solid article	-	-

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 for percent and if the ingredient is present.

<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 products are 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

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.

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