SAFETY DATA SHEET

This Safety Data Sheet (SDS) is for welding consumables and related products and 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 and Canadian Workplace Hazardous Materials Information System (WHMIS) per Health Canada administrative policy. The OSHA standard must be consulted for specific requirements. This Safety Data Sheet complies with ISO 11014-1 and ANSI Z400.1. This document is translated in several languages and is available on our website at www.hobartbrothers.com, from your sales representative or by calling customer service at 1 (937) 332-4000.

SECTION 1 – IDENTIFICATION

Manufacturer/Supplier
Name: HOBART BROTHERS LLC
Address: 101 TRADE SQUARE EAST, TROY, OH 45373
Canadian Address: 2570 NORTH TALBOT ROAD, OLDCASTLE, ONTARIO, CANADA N0R1L0
Website: www.hobartbrothers.com

Product Type: SOLID WELDING WIRE, CARBON AND LOW ALLOY STEEL, FOR GAS METAL ARC WELDING (GMAW) AND SUBMERGED ARC WELDING (SAW)

TRADE NAME: QUANTUM ARC 3, 6, D2; HB-28; SX EM13K, EM14K, S2Si-EM12K

AWS Specification: A5.17, A5.18, A5.28

Recommended Use: GAS METAL ARC WELDING (GMAW); SUBMERGED ARC WELDING (SAW)

Restrictions on Use: Use only as indicated for welding operations

SECTION 2 – IDENTIFICATION OF HAZARDS

HAZARD CLASSIFICATION – The products described in Section 1 are not classified as hazardous according to applicable GHS hazard classification criteria as required and defined in OSHA Hazard Communication Standard (29 CFR Part 1910.1200).

LABEL ELEMENTS: Hazard Symbol – No symbol required
Signal Word – No signal word required
Hazard Statement – Not applicable
Precautionary Statement – Not Applicable

HAZARDS NOT OTHERWISE CLASSIFIED

WARNING! Avoid breathing welding 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.

ARC RAYS: The welding arc can injure eyes and burn skin.

ELECTRIC SHOCK: Arc welding and associated processes can kill. See Section 8.

FUMES AND GASES: Can be dangerous to your health.

Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedures and electrodes used. Most fume ingredients are present as complex oxides and compounds and not as pure metals. When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section 3. Decomposition products of normal operation include those originating from the volatilization, reaction or oxidation, plus those from the base metal and coating, etc., of the materials shown in Section 3 of this Safety Data Sheet. Monitor for the component materials identified in the list in Section 3.

Fumes from the use of this product may contain complex oxides or compounds of the following elements and molecules: amorphous silica fume, copper, and manganese. Other reasonably expected constituents of the fume would also include complex oxides of iron, titanium, silicon, and molybdenum. Gaseous reaction products may include carbon monoxide and carbon dioxide. Oxide and nitrogen oxides may be formed by the radiation from the arc. 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). One recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample inside the welder’s helmet if worn or in the worker’s breathing zone. See ANSI/AWS F1.1 and F1.3, available from the “American Welding Society“, 8669 NW 36 Street, # 130, Miami, Florida 33166-6672, Phone: 800-443-9353 or 305-443-9353. Also, from AWS is F1.3 “Evaluating Contaminants in the Welding Environment - A Sampling Strategy Guide“, which gives additional advice on sampling.

SECTION 3 – COMPOSITION/INFORMATION ON INGREDIENTS

HAZARDOUS INGREDIENTS

IMPORTANT - This section covers the hazardous materials from which this product is manufactured. This data has been classified according to the criteria of the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) as required and defined in OSHA Hazard Communication Standard (29 CFR Part 1910.1200). The fumes and gases produced during welding with normal use of this product are addressed in Section 8.

<table>
<thead>
<tr>
<th>INGREDIENT</th>
<th>CAS NO.</th>
<th>EINECS</th>
<th>% WEIGHT</th>
<th>GHS Classification(s)</th>
<th>GHS HAZARD STATEMENTS (See Section 16 for Complete Phrases)</th>
</tr>
</thead>
<tbody>
<tr>
<td>COPPER(1)</td>
<td>7440-50-8</td>
<td>231-159-6</td>
<td>0.1-1</td>
<td>NONE</td>
<td></td>
</tr>
<tr>
<td>IRON</td>
<td>7439-89-6</td>
<td>231-096-4</td>
<td>94-99</td>
<td>NONE</td>
<td></td>
</tr>
<tr>
<td>MANGANESE</td>
<td>7439-96-5</td>
<td>231-105-1</td>
<td>0.1-5</td>
<td>- Acute Tox. 4 (Inhalation)</td>
<td>- STOT RE 1(4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Acute Tox 4 (Oral)</td>
<td>H332</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- STOT SE 3(6)</td>
<td>H332</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Eye Irrit. 2(3)</td>
<td>H332</td>
</tr>
<tr>
<td>MOLYBDENUM(2)</td>
<td>7439-98-7</td>
<td>231-107-2</td>
<td>0.1-1</td>
<td>- STOT RE 2(4)</td>
<td>H373</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Stab 2(6)</td>
<td>H319</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Eye Irr. 2(3)</td>
<td>H335</td>
</tr>
<tr>
<td>SILICON</td>
<td>7440-21-3</td>
<td>231-130-8</td>
<td>0.1-2</td>
<td>NONE</td>
<td></td>
</tr>
</tbody>
</table>
SAFETY DATA SHEET

<table>
<thead>
<tr>
<th>INGREDIENT</th>
<th>CAS NO.</th>
<th>EINECS</th>
<th>% WEIGHT</th>
<th>GHS Classification(s)</th>
<th>GHS HAZARD STATEMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>TITANIUM(0)</td>
<td>7440-32-6</td>
<td>231-142-3</td>
<td>0.2</td>
<td>NONE</td>
<td></td>
</tr>
</tbody>
</table>

--- Dashes indicate the ingredient is not present within the group of products. The European Inventory of Existing Chemical Substance Number (1) Copper, if contained in the product, is clearly visible and only present as a surface coating (2) Acute toxicity (Cat. 1, 2, 3 and 4) (3) Present only in QUANTUM ARC D2 (4) Specific target organ toxicity (STOT) – repeated exposure (Cat. 1 and 2) (5) Serious eye damage/eye irritation (Cat. 1 and 2) (6) Specific target organ toxicity (STOT) – single exposure (Cat. 1, 2) and Cat. 3 for narcotic effects and respiratory irritant, only) (7) Present only in SDX EM14K

SECTION 4 – FIRST AID MEASURES

INGESTION: Not an expected route of exposure. Do not eat, drink, or smoke while welding; wash hands thoroughly before performing these activities. If symptoms develop, seek medical attention at once.

INHALATION during welding: If breathing is difficult, provide fresh air and contact physician. If breathing has stopped, perform artificial respiration and obtain medical assistance at once.

SKIN CONTACT during welding: Remove contaminated clothing and wash the skin thoroughly with soap and water. If symptoms develop, seek medical attention at once.

EYE CONTACT during welding: Dust or fume from this product should be flushed from the eyes with copious amounts of clean, tepid water until victim is transported to an emergency medical facility. Do not allow victim to rub or keep eyes tightly closed. Obtain medical assistance at once.

Arc rays can injure eyes. If exposed to arc rays, move victim to dark room, remove contact lenses as necessary for treatment, cover eyes with a padded dressing and rest. Obtain medical assistance if symptoms persist.

Section 11 of this SDS covers the acute effects of overexposure to the various ingredients within the welding consumable. Section 8 of this SDS lists the exposure limits and covers methods for protecting yourself and your co-workers.

SECTION 5 – FIRE-FIGHTING MEASURES

Fire Hazards: 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. If there are flammable materials, including fuel or hydraulic lines, in the work area and the worker cannot move the work or the flammable material, a fire-resistant shield such as a piece of sheet metal or fire-resistant blanket should be placed over the flammable material. If welding work is conducted within 35 feet of or so of flammable materials, station a responsible person in the work zone to act as fire watcher to observe where sparks are flying and to grab an extinguisher or sound the alarm if needed.

Unused welding consumables may remain hot for a period of time after completion of a welding process. See American National Standard Institute (ANSI) Z49.1 for further general safety information on the use and handling of welding consumables and associated procedures.

Suitable Extinguishing Media: This product, as shipped, is essentially nonhazardous until welded; therefore, use a suitable extinguishing agent for a surrounding fire.

Unsuitable Extinguishing Media: None known.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

In the case of a release of solid welding consumable products, solid objects can be picked up and placed into a disposal container. If airborne dust and/or fume is present, use adequate engineering controls and, if needed, personal protection to prevent overexposure. Refer to recommendations in Section 8. Wear proper personal protective equipment while handling. Do not discard as general trash.

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 AND PERSONAL PROTECTION

Read and understand the instructions and the labels on the packaging. Welding fumes do not have a specific OSHA PEL (Permissible Exposure Limit) or ACGIH TLV (Threshold Limit Value). The OSHA PEL for Particulates – Not Otherwise Regulated (PNOR) is 5 mg/m³ – Respirable Fraction, 15 mg/m³ – Total Dust. The ACGIH TLV for Particles – Not Otherwise Specified (PNOS) is 3 mg/m³ – Respirable Particles, 10 mg/m³ – Inhalable Particles. The individual complex compounds within the fume may have a lower OSHA PEL or ACGIH TLV than the OSHA PNOR and ACGIH PNOS. An Industrial Hygienist, the OSHA PELs for Air Contaminants (29 CFR 1910.1000), and the ACGIH TLVs should be consulted to determine the specific fume constituents present and their respective exposure limits. All exposure limits are in milligrams per cubic meter (mg/m³).

<table>
<thead>
<tr>
<th>INGREDIENT</th>
<th>CAS</th>
<th>EINECS</th>
<th>OSHA PEL</th>
<th>ACGIH TLV</th>
</tr>
</thead>
<tbody>
<tr>
<td>COPPER</td>
<td>7440-50-8</td>
<td>231-159-6</td>
<td>0.1 (Fume, 1 (Dust)</td>
<td>0.2 (Fume, 1 (Dust)</td>
</tr>
<tr>
<td>IRON+</td>
<td>7439-89-6</td>
<td>231-096-4</td>
<td>5 R*</td>
<td>5 R* (Fe₂O₃) (A4)</td>
</tr>
<tr>
<td>IRON OXIDE</td>
<td>1309-37-1</td>
<td>215-168-2</td>
<td>10 (Oxide Fume)</td>
<td>5 R* (Fe₂O₃) (A4)</td>
</tr>
<tr>
<td>MANGANESE#</td>
<td>7439-96-5</td>
<td>231-105-1</td>
<td>5 CL ** (Fume)</td>
<td>0.1 R* (A4)</td>
</tr>
<tr>
<td>MOLYBDENUM</td>
<td>7439-97-8</td>
<td>231-107-2</td>
<td>5 R*</td>
<td>0.02 R* **</td>
</tr>
</tbody>
</table>

(Amorphous Silica Fume) 690126-42-2 273-761-1 0.8 2 R* |

| SILICON+   | 7440-21-3 | 231-130-8 | 5 R* | 3 R* |
| TITANIUM+  | 7440-32-6 | 231-142-3 | 5 R* | 3 R* |
| TITANIUM DIOXIDE | 13436-67-7 | 236-675-5 | 15 (Dust) | 10 (A4) |

R*: Respirable Fraction I*: Inhalable Fraction **: Ceiling Limit ***: Short Term Exposure Limit ++: As a nuisance particulate covered under "Particulates Not Otherwise Regulated" by OSHA or "Particulates Not Otherwise Classified by ACGIH ++: Crystalline silica is bound within the product as it exists in the package. However, research indicates silica is present in welding fume in the amorphous (noncrystalline) form ##: Reportable material under Section 313 of SARA ###: Reportable material under Section 313 of SARA as dust or fume ■: NIOSH REL TWA and STEL ■■: AIHA Ceiling Limit of 1 mg/m³ ■★★: Limit of 0.2 mg/m³ is for Respirable Mn in 2015 by ACGIH 6: Element Sol–Soluble Insol–Insoluble Inorg–Inorganic Cpnds—Compounds NOS – Not Otherwise Specified (A1): Confirmed Human Carcinogen per ACGIH (A2): Suspected Human Carcinogen per ACGIH (A3): Confirmed Animal Carcinogen with Unknown Relevance to Humans per ACGIH (A4): Not Classifiable as a Human Carcinogen per ACGIH (A5): Not Suspected as a Human Carcinogen per ACGIH (noncrystalline form) EINECS – European Inventory of Existing Commercial Chemical Substances OSHA – U.S. Occupational Safety and Health Administration ACGIH – American Conference of Governmental Industrial Hygienists

VENTILATION: Use enough ventilation or local exhaust at the arc or both to keep the fumes and gases below the PEL/TLV in the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes.
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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 regulatory limits.

EYE PROTECTION: Wear helmet or use face shield with filter lens for open arc welding processes. 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 from the weld arc flash.

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 as well as all non-synthetic clothing. Train the welder not to touch live electrical parts and to insulate himself from work and ground.

PROCEDURE FOR CLEANUP OF SPILLS OR LEAKS: Not applicable

Welding consumables applicable to this sheet as shipped are nonreactive, nonflammable, non-explosive and essentially nonhazardous until welded.

PHYSICAL STATE: Solid

APPEARANCE: Solid, round wire

COLOR: Gray or Copper (shiny metallic)

ODOR: Not Applicable

ODOR THRESHOLD: Not Applicable

PH: Not Applicable

MELTING POINT/FREEZING POINT: Not Available

INITIAL BOILING POINT AND BOILING RANGE: Not Available

EXPANSION COEFFICIENT: Not Available

THERMAL CONDUCTIVITY: Not Available

VAPOR DENSITY: Not Available

REACTIVITY: Not Available

Welding consumables applicable to this sheet as shipped are nonreactive, nonflammable, non-explosive and essentially nonhazardous until welded.

Welding consumables applicable to this sheet as shipped are nonreactive, nonflammable, non-explosive and essentially nonhazardous until welded.

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.

EMERGENCY AND FIRST AID PROCEDURES: Call for medical aid. Employ first aid techniques recommended by the American Red Cross. If irritation or flash burns develop after exposure, consult a physician.

CARCINOGENICITY: Titanium dioxide and welding fumes are classified as IARC Group 2B carcinogens.

CALIFORNIA PROPOSITION 65: ! WARNING: These products can expose you to chemicals, including carbon monoxide, which is known to the State of California to cause birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.

<table>
<thead>
<tr>
<th>INGREDIENT</th>
<th>CAS</th>
<th>IARC</th>
<th>NTP</th>
<th>OSHA</th>
<th>65</th>
</tr>
</thead>
</table>
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COPPER 7440-50-8 --- --- --- ---
IRON 7439-89-6 --- --- --- ---
IRON OXIDE 1309-37-1 3 --- --- ---
MANGANESE 7439-96-5 --- --- --- ---
MOLYBDENUM 7439-98-7 --- --- --- ---
Silicon 60912-64-2 3 --- --- ---
TITANIUM 7440-32-6 --- --- --- ---
TITANIUM DIOXIDE 13463-67-7 2B --- --- ---
Welding Fumes --- 1 --- --- ---


SECTION 12 – ECOLOGICAL INFORMATION

Welding processes can release 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 CONSIDERATIONS

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.

SECTION 14 – TRANSPORT INFORMATION

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

SECTION 15 – REGULATORY INFORMATION

Read and understand the manufacturer’s instructions, your employer’s safety practices and the health and safety instructions on the label and the safety data sheet. Observe all local and federal rules and regulations. Take all necessary precautions to protect yourself and others.

United States EPA Toxic Substance Control Act: All constituents of these products are on the TSCA inventory list or are excluded from listing.

CERCLA/SARA TITLE III: Reportable Quantities (RQs) and/or Threshold Planning Quantities (TPQs):

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>RQ(lb)</th>
<th>TPQ(lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Products on this SDS are a solid solution in the form of a solid article.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>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 your Local Emergency Planning Committee.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Section 311 Hazard Class
As shipped: Immediate In use: Immediate delayed

EPCRA/SARA TITLE III 313 TOXIC CHEMICALS: The following metallic components are listed as SARA 313 “Toxic Chemicals” and potentially subject to annual SARA 312 reporting: Copper and Manganese. See Section 3 for weight percentage.

CANADIAN WHMIS CLASSIFICATION: Class D; Division 2, Subdivision A

CANADIAN CONTROLLED PRODUCTS REGULATION: This product has been classified in accordance with the hazard criteria of the CPR and the SDS contains all of the information required by the CPR.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA): All constituents of these products are on the Domestic Substance List (DSL).

SECTION 16 – OTHER INFORMATION

The following Hazard Statements, provided in the OSHA Hazard Communication Standard (29 CFR Part 1910.1200) correspond to the columns labeled ‘GHS Hazard Statements’ within Section 3 of this safety data sheet. Take appropriate precautions and protective measures to eliminate or limit the associated hazard.

H302: Harmful if swallowed
H319: Causes serious eye irritation
H332: Harmful if inhaled
H355: May cause respiratory irritation
H351: Suspected of causing cancer
H372: Causes damage to organs through prolonged or repeated exposure
H373: May cause damage to organs through prolonged or repeated exposure

For additional information please refer to the following sources:

Threshold Limit Values and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists (ACGIH), 6500 Glenway Ave., Cincinnati, Ohio 45211, USA.
NFPA 518 “Standard for Fire Prevention During Welding, Cutting and Other Hot Work” published by the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169.

Canada: CSA Standard CAN/CSA-W117.2-01 “Safety in Welding, Cutting and Allied Processes”.

Hobart Brothers LLC strongly recommends the users of this product study this SDS, the product label information and become aware of all hazards associated with welding. Hobart Brothers LLC believes this data to be accurate and to reflect qualified expert opinion regarding current research. However, Hobart Brothers LLC cannot make any expressed or implied warranty as to this information.