

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

Telephone No: +1 (937) 332-4000
Emergency No: +1 (800) 424-9300
Canada: +1 (519) 737-3053

Products Type: FLUX FOR FLUX CORED, METAL CORED AND COMPOSITE SUBMERGED ARC WELDING ELECTRODES

GROUP A: Trade Name: FORMULA XL550 Flux
GROUP B: Trade Name: FSD 71T8, 81N1, X80 and 91T8 Flux
GROUP C: Trade Name: FSD 71T8 w/o BaF₂ and 91T8 w/o BaF₂ Flux
GROUP D: Trade Name: MATRIX Flux

AWS Specification: None

Recommended Use: FLUX FOR FLUX CORED, METAL CORED AND COMPOSITE SUBMERGED ARC WELDING ELECTRODES
Restrictions on Use: Use only as indicated for welding operations

SECTION 2 – HAZARDS IDENTIFICATION

Group A

HAZARD CLASSIFICATION – This product as described in Section 1 is classified as hazardous according to applicable GHS hazard classification criteria as required and defined in OSHA Hazard Communication Standard (29 CFR Part 1910.1200).

- Acute Toxicity - Oral Category 3
- Acute Toxicity – Dermal Category 3
- Acute Toxicity - Inhalation Category 3
- Specific Target Organ Toxicity (Repeated Exposure) Category 2
- Carcinogenicity Category 2

LABEL ELEMENTS

Hazard Pictograms:

Signal Word – DANGER

Hazard Statements:

H301: Toxic if swallowed
H311: Toxic in contact with skin
H331: Toxic if inhaled
H351: Suspected of causing cancer through inhalation
H373: May cause damage to organs through prolonged or repeated exposure through inhalation

Precautionary Statements:

P201: Obtain special instructions before use.
P202: Do not handle until all safety precautions have been read and understood.
P260: Do not breathe dusts/fume/gas/mists/vapours/spray.
P264: Wash affected areas thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P271: Use only outdoors or in a well-ventilated area.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P302 + P352: IF ON SKIN: Wash with plenty of soap and water.
P304 + P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P311: Call a POISON CENTER or doctor/physician.
P321: Specific treatment (see first aid instructions on this label)
P322:
P330: Rinse mouth
P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P312: Call a POISON CENTER if you feel unwell.
P308 + P313: If exposed or concerned: Get medical advice/attention.
P314: Get medical advice/attention if you feel unwell.
P362: Take off contaminated clothing and wash before reuse.
P403 + P233: Store in a well-ventilated place. Keep container tightly closed.
P405: Store locked up.
P501: Dispose of contents and container in accordance with local and national regulations

SAFETY DATA SHEET

Group B

HAZARD CLASSIFICATION – This product as described in Section 1 is classified as hazardous according to applicable GHS hazard classification criteria as required and defined in OSHA Hazard Communication Standard (29 CFR Part 1910.1200).

- Acute Toxicity - Oral Category 4
- Acute Toxicity - Inhalation Category 4
- Specific Target Organ Toxicity (Repeated Exposure) Category 2
- Carcinogenicity Category 2

LABEL ELEMENTS

Hazard Pictograms:



Signal Word – WARNING

Hazard Statements:

H302: Harmful if swallowed

H332: Harmful If inhaled

H351: Suspected of causing cancer through inhalation

H373: May cause damage to organs through prolonged or repeated exposure through inhalation

Precautionary Statements:

P201: Obtain special instructions before use.

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

P260: Do not breathe dusts/fume/gas/mists/vapours/spray.

P264: Wash affected areas thoroughly after handling.

P270: Do not eat, drink or smoke when using this product.

P271: Use only outdoors or in a well-ventilated area.

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

P301 + P312: IF SWALLOWED: Call a POISON CENTER

P330: Rinse mouth

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P312: Call a POISON CENTER if you feel unwell.

P308 + P313: If exposed or concerned: Get medical advice/attention.

P314: Get medical advice/attention if you feel unwell.

P405: Store locked up.

P501: Dispose of contents and container in accordance with local and national regulations.

GROUP C:

CLASSIFICATION OF SUBSTANCE OR MIXTURE – These products as described in Section 1 are classified as hazardous according to applicable GHS hazard classification criteria as required and defined in OSHA Hazard Communication Standard (29 CFR Part 1910.1200).

- Acute Toxicity - Oral Category 4
- Acute Toxicity - Inhalation Category 4
- Specific Target Organ Toxicity (Repeated Exposure) Category 2
- Carcinogenicity Category 2

LABEL ELEMENTS

Hazard Pictograms:



Signal Word – WARNING

Hazard Statements:

H302: Harmful if swallowed

H332: Harmful If inhaled

H351: Suspected of causing cancer through inhalation

H373: May cause damage to organs through prolonged or repeated exposure through inhalation

Precautionary Statements:

P201: Obtain special instructions before use.

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

P260: Do not breathe dusts/fume/gas/mists/vapours/spray.

P264: Wash affected areas thoroughly after handling.

P270: Do not eat, drink or smoke when using this product.

P271: Use only outdoors or in a well-ventilated area.

SAFETY DATA SHEET

P280: Wear protective gloves/protective clothing/eye protection/face protection.
P301 + P312: IF SWALLOWED: Call a POISON CENTER
P330: Rinse mouth
P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P312: Call a POISON CENTER if you feel unwell.
P308 + P313: If exposed or concerned: Get medical advice/attention.
P314: Get medical advice/attention if you feel unwell.
P405: Store locked up.
P501: Dispose of contents and container in accordance with local and national regulations.

GROUP D:

CLASSIFICATION OF SUBSTANCE OR MIXTURE – These products as described in Section 1 are classified as hazardous according to applicable GHS hazard classification criteria as required and defined in OSHA Hazard Communication Standard (29 CFR Part 1910.1200).

- Acute Toxicity - Oral Category 4
- Acute Toxicity - Inhalation Category 4
- Specific Target Organ Toxicity (Repeated Exposure) Category 2
- Carcinogenicity Category 2

LABEL ELEMENTS

Hazard Pictograms:



Signal Word – WARNING

Hazard Statements:

H302: Harmful if swallowed
H332: Harmful If inhaled
H351: Suspected of causing cancer through inhalation
H372: Causes damage to organs through prolonged or repeated exposure

Precautionary Statements:

P201: Obtain special instructions before use.
P202: Do not handle until all safety precautions have been read and understood.
P260: Do not breathe dusts/fume/gas/mists/vapours/spray.
P264: Wash affected areas thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P271: Use only outdoors or in a well-ventilated area.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P301 + P312: IF SWALLOWED: Call a POISON CENTER
P330: Rinse mouth
P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P312: Call a POISON CENTER if you feel unwell.
P308 + P313: If exposed or concerned: Get medical advice/attention.
P314: Get medical advice/attention if you feel unwell.
P405: Store locked up.
P501: Dispose of contents and container in accordance with local and national regulations.

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.

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

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

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, antimony oxide, calcium oxide, fluorspar or fluorides, manganese and silica. Other reasonably expected constituents of the fume would also include complex oxides of iron, titanium and silicon. Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone 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.

SAFETY DATA SHEET

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.

INGREDIENT	CAS NO.	EINECS'	GROUP AND %WEIGHT				GHS Classification(s)	GHS HAZARD STATEMENTS (See Section 16 for Complete Phrases)
			A	B	C	D		
ALUMINUM	7429-90-5	231-072-3	<2	5-10	14-20	---	Powder (pyrophoric): - Pyr. Sol. 1 ⁽¹⁾ - Water-react. 2 ⁽²⁾ Powder (Stabilized): - Flam. Sol. 1 ⁽³⁾ - Water-react. 2 ⁽²⁾	H250 H261 H228 H261
ALUMINUM OXIDE	1344-28-1	215-691-6	<5	<3	2-6	---	NONE	
ANTIMONY TRIOXIDE	1309-64-4	215-175-0	---	---	---	<1	- Carc. 2 ⁽⁵⁾	H351
BARIUM FLUORIDE	7787-32-8	232-108-0	---	40-50	---	---	NONE	
CERIUM OXIDE	1306-38-3	215-150-4	---	<5	<5	---	NONE	
COBALT	7440-48-4	231-158-0	<1	<2	<1	---	- Resp. Sens. 1 ⁽⁶⁾ - Skin Sens. 1 ⁽⁷⁾ - Aquatic Chronic 4	H334 H317 H413
IRON	7439-89-6	231-096-4	13-16	<3	<5	75-90	NONE	
IRON OXIDE	1309-37-1	215-168-2	---	8-13	12-22	<3	NONE	
LITHIUM FLUORIDE	7789-24-4	232-152-0	---	4-9	9-17	---	- EUH014 ⁽⁸⁾ - Skin Corr. 1B ⁽⁹⁾	EUH014 H314
LITHIUM OXIDE	12057-24-8	235-019-5	---	<3	<5	---	- EUH014 ⁽⁸⁾ - Skin Corr. 1B ⁽⁹⁾	EUH014 H314
MAGNESIUM	7439-95-4	231-104-6	<5	5-8	10-15	---	Powder (pyrophoric): - Pyr. Sol. 1 ⁽¹⁾ - Water-react. 1 ⁽²⁾ Powder or turnings: - Flam. Sol. 1 ⁽³⁾ - Self-heat. 1 ⁽¹⁰⁾ - Water-react. 2 ⁽²⁾	H250 H260 H228 H252 H261
MANGANESE	7439-96-5	231-105-1	10-15	<4	4-8	8-12	- Acute Tox. 4 (Oral) ⁽³⁾ - Acute Tox. 4 (Inhalation) ⁽³⁾ - STOT RE 1 ⁽⁴⁾	H302 H332 H372
MANGANESE OXIDE	1344-43-0	215-695-8	---	<3	<5	---	NONE	
NICKEL	7440-02-0	231-111-4	<4	2-15	5-25	---	Powder/Element: - Carc. 2 ⁽⁵⁾ - Skin Sens. 1 ⁽⁷⁾ - STOT RE 1 ⁽⁴⁾ - Aquatic Chronic 3	H351 H317 H372 H412
NIOBIUM PENTOXIDE	1313-96-8	215-213-6	<1	---	---	---	NONE	
POTASSIUM HEXAFLUOROSILICATE	16871-90-2	240-896-2	<2	---	---	---	- Acute Tox. 3 (Oral) ⁽¹¹⁾ - Acute Tox. 3 (Dermal) ⁽¹¹⁾ - Acute Tox. 3 (Inhalation) ⁽¹¹⁾	H301 H311 H331
SILICA	14808-60-7	238-878-4	<2	<1	<1	---	- STOT RE 2 ⁽⁴⁾ - Carc. 2 ⁽⁵⁾ - Acute Tox. 4 (Inhalation) ⁽¹¹⁾	H373 H351 H332
(Amorphous Silica Fume)	69012-64-2	273-761-1	---	---	---	---	NONE	
SILICON	7440-21-3	231-130-8	<2	---	---	4-6	NONE	
SODIUM SILICATE			<2	<1	<1	---		

SAFETY DATA SHEET

INGREDIENT	CAS NO.	EINECS*	GROUP AND %WEIGHT				GHS Classification(s)	GHS HAZARD STATEMENTS (See Section 16 for Complete Phrases)
			A	B	C	D		
TITANIUM	7440-32-6	231-142-3	<5	---	---	<1	NONE	
TITANIUM DIOXIDE	13463-67-7	236-675-5	40-60	---	---	---	- Carc 2 ⁽⁵⁾	H351
ZIRCONIUM	7440-67-7	231-176-9	---	<2	<4	---	- Pyr. Sol. 1 ⁽¹⁾ - Water-react. 1 ⁽²⁾	H250 H260

--- Dashes indicate the ingredient is not present within the group of products **Γ** – European Inventory of Existing Commercial Chemical Substances **(1)** Pyrophoric solid (Cat. 1) **(2)** Substance or mixture which in contact with water emits flammable gases (Cat. 1, 2 and 3) **(3)** Flammable solid (Cat. 1 and 2) **(4)** Specific target organ toxicity (STOT) – repeated exposure (Cat. 1 and 2) **(5)** Carcinogenicity (Cat. 1A, 1B and 2) **(6)** Respiratory sensitization (Cat. 1, Sub-cat. 1A and 1B) **(7)** Skin sensitization (Cat. 1, Sub-cat. 1A and 1B) **(8)** See EUH-Statements in Section 16 **(9)** Skin corrosion/irritation (Cat. 1, 1A, 1B, 1C and 2) **(10)** Self-heating substance or mixture (Cat. 1 and 2) **(11)** Acute toxicity (Cat. 1, 2, 3 and 4)

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 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, granular flux objects can be swept 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/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).

INGREDIENT	CAS	EINECS	OSHA PEL	ACGIH TLV
ALUMINUM###	7429-90-5	231-072-3	5 R*, 15 (Dust)	1 R* {A4} 5 (Welding fumes, as Al)
ALUMINUM OXIDE##	1344-28-1	215-691-6	5 R*	1 R* {A4} 10 (as Al, Tot particulate)
ANTIMONY TRIOXIDE	1309-64-4	215-175-0	0.5 (as Sb)	0.5 (as Sb) {A2}
BARIUM FLOURIDE#	7787-32-8	232-108-0	0.5 (as Ba)	0.5 (as Ba) {A4}
BARIUM OXIDE (as Ba)	1304-28-5	215-127-9	0.5 0.5■■■■	0.5
CERIUM OXIDE	1306-38-3	215-150-4	5 R*, 15 (Dust)	3 R*, 10 I*
COBALT (Metal, dust and fume, as Co)	7440-48-4	231-158-0	0.1 (Dust and Fume)	0.02 {A3}
IRON+	7439-89-6	231-096-4	5 R*	5 R* (Fe ₂ O ₃) {A4}
IRON OXIDE	1309-37-1	215-168-2	10 (Oxide Fume)	5 R* (Fe ₂ O ₃) {A4}
LITHIUM FLUORIDE	7789-24-4	232-152-0	2.5 (as F)	2.5 (as F) {A4}

SAFETY DATA SHEET

LITHIUM OXIDE	12057-24-8	235-019-5	1 ■■	3 R*, 10 (Dust)
MAGNESIUM+	7439-95-4	231-104-6	5 R*	3 R*
MAGNESIUM OXIDE	1309-48-4	215-171-9	15 (Fume, Total Part)	10 I* {A4}
MANGANESE#	7439-96-5	231-105-1	5 CL ** (Fume)	0.1 I* {A4} ◆
			1, 3 STEL*** ■	0.02 R* ◆◆
MANGANOUS OXIDE	1344-43-0	215-171-9	5 CL ** (Fume)	0.1 I* {A4} ◆
			1, 3 STEL*** ■	0.02 R* ◆◆
NICKEL#	7440-02-0	231-111-4	1 (Metal)	1.5 I* (Ele) {A5}
			1 (Sol Cpnds)	0.1 I* (Sol Cpnds) {A4}
			1 (Insol Cpnds)	0.2 I* (Insol Cpnds) {A1}
NIOBIUM PENTOXIDE	1313-96-8	215-213-6	Not Established	Not Established
POTASSIUM SILICATE	1312-76-1	215-199-1	Not established	Not established
SILICA++	14808-60-7	238-878-4	0.05 R*	0.025 R* {A2}
(Amorphous Silica Fume)	69012-64-2	273-761-1	0.8	2 R*
SILICON+	7440-21-3	231-130-8	5 R*	3 R*
SODIUM SILICATE	1344-09-8	215-687-4	Not established	Not established
TITANIUM DIOXIDE	13463-67-7	236-675-5	15 (Dust)	10 {A4}
ZIRCONIUM	7440-67-7	231-176-9	5 (Zr Cpnds)	5, 10 STEL*** (Zr Cpnds) {A4}
			5, 10 STEL***■(Zr Cpnds)	

PEL – Permissible Exposure Limit TLV – Threshold Limit Value R* - Respirable Fraction R*** - Respirable Fraction - Short Term Exposure Limit I* - Inhalable Fraction I*** - Inhalable Fraction - Short Term Exposure Limit ** - 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 only in fibrous form ■ - NIOSH REL TWA and STEL ◆ - Limit of 0.1 mg/m³ is for Inhalable Mn in 2013 by ACGIH ◆◆ - Limit of 0.02 mg/m³ is for Respirable Mn in 2013 by ACGIH Cpnds – Compounds NOS – Not Otherwise Specified {A2} - Suspected Human Carcinogen per ACGIH {A4} - Not Classifiable as a Human Carcinogen per ACGIH ACGIH - American Conference of Governmental Industrial Hygienists OSHA – Occupational Safety and Health Administration (USA) EINECS – European Inventory of Existing Commercial Chemical Substances.

VENTILATION: Use enough ventilation, 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.

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. 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 dark 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

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. Refer to the following sources for important additional information: American National Standard Institute (ANSI) Z49.1; Safety in Welding and Cutting published by the American Welding Society, 8669 NW 36 Street, # 130, Miami, Florida 33166-6672 and OSHA Publication 2206 (29 CFR 1910), U.S. Government Printing Office, Washington, DC 20402.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

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

PHYSICAL STATE: Solid

APPEARANCE: Granular

COLOR: Varies by product

ODOR: Not Applicable

ODOR THRESHOLD: Not Applicable

pH: Not Applicable

MELTING POINT/FREEZING POINT: Not Available

INITIAL BOILING POINT AND BOILING RANGE: Not Available

FLASH POINT: Not Available

EVAPORATION RATE: Not Applicable

FLAMMABILITY (SOLID, GAS): Not Available

UPPER/LOWER FLAMMABILITY OR EXPLOSIVE LIMITS: Not Available

VAPOR PRESSURE: Not Applicable

VAPOR DENSITY: Not Applicable

RELATIVE DENSITY: Not Available

SOLUBILITY: Not Available

PARTITION COEFFICIENT: N-OCTANOL/WATER: Not Applicable

AUTO-IGNITION TEMPERATURE: Not Available

DECOMPOSITION TEMPERATURE: Not Available

VISCOSITY: Not Applicable

EXPLOSIVE PROPERTIES: Not Available

OXIDIZING PROPERTIES: Not Available

SECTION 10 – STABILITY AND REACTIVITY

GENERAL: Welding consumables applicable to this sheet are solid and nonvolatile as shipped. This product is only intended for use per the welding parameters it was designed for. When this product is used for welding, hazardous fumes may be created. Other factors to consider include the base metal, base metal preparation and base metal coatings. All of these factors can contribute to the fume and gases generated during welding. The amount of fume varies with the welding parameters.

STABILITY: This product is stable under normal conditions.

REACTIVITY: Contact with acids or strong bases may cause generation of gas.

SECTION 11 – TOXICOLOGICAL INFORMATION

SHORT-TERM (ACUTE) OVEREXPOSURE EFFECTS: **Welding Fumes** - May result in discomfort such as dizziness, nausea or dryness or irritation of nose, throat or eyes. **Aluminum Oxide** - Irritation of the respiratory system. **Antimony Compounds** - Irritation of nose, throat, eyes and skin. **Barium Oxide** - Aching eyes, rhinitis, frontal headache, wheezing, laryngeal spasms, salivation or anorexia. **Cerium Oxide** - Irritation of the eyes, nose and throat. **Cobalt** - Pulmonary irritation, cough, dermatitis, weight loss. **Fluorides** - Fluoride compounds evolved may cause skin and eye burns, pulmonary edema and bronchitis. **Iron, Iron Oxide** - None are known. Treat as nuisance dust or fume. **Lithium Compounds** - Overexposure may cause tremor and nausea. **Magnesium, Magnesium Oxide** - Overexposure to the oxide may cause metal fume fever characterized by metallic taste, tightness of chest and fever. Symptoms may last 24 to 48 hours following overexposure. **Manganese, Manganous Oxide** - 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. **Nickel, Nickel Compounds** - Metallic taste, nausea,

SAFETY DATA SHEET

tightness in chest, metal fume fever, allergic reaction. **Niobium** - Dust or fumes may cause irritation of the respiratory system, skin and eyes. **Potassium Oxide** - Dust or fumes may cause irritation of the respiratory system, skin and eyes. **Silica (Amorphous)** - Dust and fumes may cause irritation of the respiratory system, skin and eyes. **Silica (Crystalline Quartz)** - Irritation of the respiratory system, skin, and eyes. **Sodium Oxide** - Dust or fumes may cause irritation of the respiratory system, skin and eyes. **Titanium Dioxide** - Irritation of respiratory system. **Zirconium** - May cause irritation of the eyes, nose and throat due to mechanical effects.

LONG-TERM (CHRONIC) OVEREXPOSURE EFFECTS: **Welding Fumes** - Excess levels may cause bronchial asthma, lung fibrosis, pneumoconiosis or "siderosis." IARC studies indicate sufficient evidence for carcinogenicity in humans. Studies have concluded that there is sufficient evidence for ocular melanoma in welders. **Aluminum Oxide** - Pulmonary fibrosis and emphysema. **Antimony Compounds** - Metal fume fever, dermatitis, keratitis, conjunctivitis and ulceration and perforation of the nasal septum. Avoid conditions in which fresh hydrogen will react with antimony to form stibine which is extremely toxic. **Barium Oxide** - Long-term overexposure to soluble barium compounds may cause nervous disorders and may have deleterious effects on the heart, circulatory system and musculature. **Cerium Oxide** - Prolonged overexposure may result in loss of appetite, weight loss, loss of muscle coordination, difficulty in breathing and anemia. **Cobalt** - Repeated overexposure to cobalt compounds can produce reduced pulmonary function, diffuse nodular fibrosis of lungs and respiratory hypersensitivity. **Fluorides** - Serious bone erosion (Osteoporosis) and mottling of teeth. **Iron, Iron Oxide Fumes** - 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. **Lithium Compounds** - May be considered as potentially teratogenic. **Magnesium, Magnesium Oxide** - No adverse long term health effects have been reported in the literature. **Manganese, Manganese Oxide** - 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. **Niobium** - No adverse long term health effects have been reported in the literature. **Potassium Oxide** - Prolonged overexposure may cause ulceration of the skin and perforation of the nasal septum, dermatitis and pneumonia. **Silica (Amorphous)** - Research indicates that silica is present in welding fume in the amorphous form. Long term overexposure may cause pneumoconiosis. Noncrystalline forms of silica (amorphous silica) are considered to have little fibrotic potential. **Silica (Crystalline Quartz)** - Overexposure can cause silicosis. IARC studies indicate sufficient evidence for carcinogenicity in humans. **Sodium Oxide** - Prolonged overexposure may cause ulceration of the skin and perforation of the nasal septum, dermatitis and pneumonia. **Titanium Dioxide** - Pulmonary irritation and slight fibrosis. **Zirconium** - May cause pulmonary fibrosis and pneumoconiosis.

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 International Red Cross. If irritation or flash burns develop after exposure, consult a physician.

CARCINOGENICITY: Silica (crystalline quartz), ultraviolet radiation and welding fume are classified as IARC Group 1 carcinogens and silica is also classified as an NTP Group K carcinogen. Titanium dioxide and antimony trioxide are classified as IARC Group 2B carcinogens.

CALIFORNIA PROPOSITION 65:

⚠ WARNING: These products can expose you to chemicals, including titanium dioxide and/or antimony trioxide and/or nickel, which are known to the State of California to cause cancer, and to 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.

INGREDIENT	CAS	IARC ^E	NTP ^Z	OSHA ^H	65 ^O
ALUMINUM	7429-90-5	---	---	---	---
ALUMINUM OXIDE	1344-28-1	---	---	---	---
ANTIMONY TRIOXIDE	1309-64-4	2B	---	---	X
BARIUM FLOURIDE	7787-32-8	---	---	---	---
BARIUM OXIDE	1304-28-5	---	---	---	---
CERIUM OXIDE	1306-38-3	---	---	---	---
COBALT	7440-48-4	2B	---	X	X
IRON	7439-89-6	---	---	---	---
IRON OXIDE	1309-37-1	3	---	---	---
LITHIUM FLUORIDE	7789-24-4	---	---	---	---
LITHIUM OXIDE	12057-24-8	---	---	---	---
MAGNESIUM	7439-95-4	---	---	---	---
MAGNESIUM OXIDE	1309-48-4	---	---	---	---
MANGANESE	7439-96-5	---	---	---	---
MANGANOUS OXIDE	1344-43-0	---	---	---	---
NICKEL	7440-02-0	2B ^B , 1 ^{BB}	S ^B , K ^{BB}	---	X ^B , X ^{BB}
NIOBIUM PENTOXIDE	1313-96-8	---	---	---	---
POTASSIUM SILICATE	1312-76-1	---	---	---	---
SILICA	14808-60-7	1 ^ψ	K	---	X
(Amorphous Silica fume)	69012-64-2	3	---	---	---
SILICON	7440-21-3	---	---	---	---
SODIUM SILICATE	1344-09-8	---	---	---	---
TITANIUM DIOXIDE	13463-67-7	2B	---	---	X
Ultraviolet Radiation	--	1	---	---	---
Welding Fumes	--	1	---	---	---
ZIRCONIUM	7440-67-7	---	---	---	---

E – International Agency for Research on Cancer (1 – Carcinogenic to Humans, 2A – Probably Carcinogenic to Humans, 2B – Possibly Carcinogenic to Humans, 3 – Not Classifiable as to its Carcinogenicity to Humans, 4 Probably Not Carcinogenic to Humans) Z – US National Toxicology Program (K – Known Carcinogen, S – Suspected Carcinogen) H – OSHA Designated Carcinogen List ☉ – California Proposition 65 (X – On Proposition 65 list) ψ – Silica Crystalline α-Quartz --- Dashes indicate the ingredient is not listed with the IARC, NTP, OSHA or Prop 65

SECTION 12 – ECOLOGICAL INFORMATION

Welding processes can release fumes directly to the environment. Welding flux (granular) can degrade if left outside and unprotected. Residues from welding consumables and processes could degrade and accumulate in the soil and groundwater.

SAFETY DATA SHEET

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 material 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):

Ingredient name	RQ(lb)	TPQ (lb)
Products on this SDS are in the form of a granular solid.	--	--

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.

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: Aluminum Oxide, Antimony Trioxide, Manganese and Nickel. See Section 3 for weight percentage.

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

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.

H250: Catches fire spontaneously if exposed to air
H260: In contact with water releases flammable gases which may ignite spontaneously
H301: Toxic if swallowed
H302: Harmful if swallowed
H311: Toxic in contact with skin
H315: Causes skin irritation
H318: Causes serious eye damage
H331: Toxic if inhaled
H332: Harmful if inhaled
H335: 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:

USA: **American National Standard Institute (ANSI) Z49.1** "Safety in Welding and Cutting", **ANSI/American Welding Society (AWS) F1.5** "Methods for Sampling and Analyzing Gases from Welding and Allied Processes", **ANSI/AWS F1.1** "Method for Sampling Airborne Particles Generated by Welding and Allied Processes", **AWSF3.2M/F3.2** "Ventilation Guide for Weld Fume", "American Welding Society", 8669 NW 36 Street, # 130, Miami, Florida 33166-6672, Phone: 800-443-9353 or 305-443-9353. Safety and Health Fact Sheets available from AWS at www.aws.org.

OSHA Publication 2206 (29 C.F.R. 1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954.

Threshold Limit Values and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists (ACGIH), 6500 Glenway Ave., Cincinnati, Ohio 45211, USA.

NFPA 51B "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.