

Safety Data Sheet (SDS)**Section 1 – Identification****1(a) Product Identifier used on Label: Flux cored wire for Hardox® wear plate****1(b) Other means of identification:** Code Number: SSAB – 022**1(c) Recommended use of the chemical and restrictions on use:** Arc welding in structural steel for sustainable & lightweight solutions, wear plate for maximum payload & longer service life, cold rolled steel for lightweight & safe components, structural steel for heavy & demanding applications, pre-painted steel for sustainable & durable buildings, protection plate for the safety of life & property, ready-to-use engineering & tool steel for saving time to market.**1(d) Name, address, and telephone number:**SSAB Americas Phone: (251) 662-4447
801 Warrenville Road, Suite 800 Lisle,
Illinois 60532**1(e) Emergency phone number:** (563) 381-5311**Section 2 – Hazard(s) Identification****2(a) Classification of the chemical:** Not classified**2(b) Signal word, hazard statement(s), symbols and precautionary statement(s):** The product do not require labeling**2(c) Hazards not otherwise classified:** This product contains cryolite, which is classified as toxic and dangerous for the environment. In the form this substance is present in this product it does not contribute to a hazard classification of the product. This product contains titanium dioxide which is possibly carcinogenic. Skin contact is normally no hazard but should be avoided to prevent 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 device.

When this product is used in a welding process, the most important hazards are welding fumes, heat, radiation and electric shock.

Fumes: Overexposure to welding fumes may result in symptoms like metal fume fever, dizziness, nausea, dryness or irritation of the nose, throat or eyes. Chronic overexposure to welding fumes may affect pulmonary function. Prolonged inhalation of nickel and chromium compounds above safe exposure limits can cause cancer. 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, disturbances and spastic gait. This product contains substances that may be sensitizing.

Heat: Spatter and melting metal can cause burn injuries and start fires.

Radiation: Arc rays can severely damage eyes or skin.

Electricity: Electric shock can kill.

This product is normally not considered hazardous as shipped. Gloves should be worn when handling to prevent cuts and abrasions.

2(d) Unknown acute toxicity statement (mixture). Not known.**Section 3 – Composition/Information on Ingredients****3(a-c) Chemical name, common name (synonyms), CAS number and other identifiers, and concentration:**

| Chemical Name | CAS Number | EC Number | % weight |
|-------------------|------------|-----------|----------|
| Iron | 7439-89-6 | 231-096-4 | 80-90 |
| Titanium oxide** | 13463-67-7 | 236-675-5 | 5-10 |
| Manganese | 7439-96-5 | 231-105-1 | 2-5 |
| Aluminum silicate | 12141-46-7 | 235-253-8 | <1 |
| Silicon | 7440-21-3 | 231-130-8 | <1 |

This Safety Data Sheet complies with Annex II of 830/2015 amending EC No. 1907/2006, CLP directive 1272/2008, also in accordance with ISO 11014-1 and ANSI Z400.1

| | | | |
|--|------------|-----------|------|
| Cryolite (Aquatic Chronic 2, STOT RE 1, Acute Tox. 4 – inhalation) | 15096-52-3 | 239-148-8 | <0.5 |
|--|------------|-----------|------|

EC - European Community
 CAS - Chemical Abstract Service
Notes: This product is a preparation of flux-cored wire.

Section 4 – First-aid Measures

4(a) Description of necessary measures:

Electric shock: Disconnect and turn off the power. Use a nonconductive material to pull victim away from contact with live parts or wires. If not breathing, begin artificial respiration, preferably mouth-to-mouth. If no detectable pulse, begin Cardio Pulmonary Resuscitation (CPR). Call emergency physician to the scene of the accident. Call a physician immediately.

- **Inhalation:** If breathing has stopped, perform artificial respiration and obtain medical assistance immediately! If breathing is difficult, provide fresh air and call physician.
- **Eye Contact:** For radiation burns due to arc flash, see physician. To remove dusts or fumes flush with water for at least fifteen minutes. If irritation persists, obtain medical assistance.
- **Skin Contact:** For skin burns from arc radiation, promptly flush with cold water. Get medical attention for burns or irritations that persist. To remove dust or particles wash with mild soap and water.

4(b) Most important symptoms/effects, acute and delayed (chronic): Not applicable

4(c) Immediate Medical Attention and Special Treatment: Not applicable

Section 5 – Fire-fighting Measures

5(a) Suitable (and unsuitable) Extinguishing Media: No specific recommendations for welding consumables. Welding arcs and sparks can ignite combustible and flammable materials. Use the extinguishing media recommended for the burning materials and fire situation.

5(b) Specific Hazards arising from the chemical: Not Applicable

5(c) Special protective equipment and precautions for fire-fighters: Wear self-contained breathing apparatus as fumes or vapors may be harmful.

Section 6 - Accidental Release Measures

6(a) Personal Precautions, Protective Equipment and Emergency Procedures: Wear hand, head, eyes, ear and body protection like welders gloves, helmet or face shield with filter lens, safety boots, apron, arm and shoulder protection. Keep protective clothing clean and dry.

The product as supplied should be handled in gloves to minimize the potential for abrasions or superficial injury to skin arising from the characteristics of the solid product. Suitable gloves for physical hazard protection would include leather gloves, cut-resistant gloves and coated fabric gloves. Anyone with an existing or suspected sensitivity to one of the ingredients, such as nickel when present, should use an impermeable glove such as nitrile, butyl rubber or other barrier material. We do not recommend latex gloves due to their potential to elicit sensitivity or allergic response in some individuals. Barrier gloves can be worn under durable gloves to protect the barrier gloves from potential damage. Gloves specifically designed for welding protection must be used when the product is used in a welding, cutting or gouging activity.

6(b) Methods and materials for containment and clean up: Solid objects may be picked up and placed into a container. Liquids or pastes should be scooped up and placed into a container. Wear proper protective equipment while handling these materials. Do not discard as refuse.

Section 7 - Handling and Storage

7(a) Precautions for safe handling: Handle with care to avoid stings and 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 identity labels.

7(b) Conditions for safe storage, including any incompatibilities: Keep separate from chemical substances like acids and strong bases, which could cause chemical reactions.

Section 8 - Exposure Controls / Personal Protection

8(a) Occupational Exposure Limits (OELs): Use industrial hygiene monitoring equipment to ensure that exposure does not exceed applicable national exposure limits. The following limits can be used as guidance. Unless noted, all values are for 8 hour time weighted averages (TWA). For information about welding fume analysis refer to Section 10.

| Ingredient | CAS No | ECN No | Exposure limit mg/m3-ppm | Short term exposure limit mg/m3-ppm | Ceiling exposure limit mg/m3-ppm | Remark | Source | Year |
|-------------------|------------|-----------|--------------------------|-------------------------------------|----------------------------------|------------------------|--------|------|
| Cryolite | 15096-52-3 | 239-148-8 | 2,5 | - | - | as F | OSHA | 2016 |
| Iron | 7439-89-6 | 231-096-4 | - | - | - | No PEL | OSHA | 2016 |
| Manganese | 7439-96-5 | 231-105-1 | - | - | 5 | as Mn (metal and fume) | OSHA | 2016 |
| Silicon | 7440-21-3 | 231-130-8 | 15 | | | Total dust | OSHA | 2016 |
| Silicon | 7440-21-3 | 231-130-8 | 5 | | | Respirable fraction | OSHA | 2016 |
| Titanium oxide** | 13463-67-7 | 236-675-5 | 15 | | | Total dust | OSHA | 2016 |
| Aluminum silicate | 12141-46-7 | 235-253-8 | 15 | | | Total dust | OSHA | 2016 |
| Aluminum silicate | 12141-46-7 | 235-253-8 | 5 | | | Respirable fraction | OSHA | 2016 |

8(b) Exposure Controls: Not applicable

8(c) Other: Avoid exposure to welding fumes, radiation, spatter, electric shock, heated materials and dust. Train welders to avoid contact with live electrical parts and insulate conductive parts.

- **Ventilation:** Use respirator or air supplied respirator when welding or brazing in a confined space, or where local exhaust or ventilation is not sufficient to keep exposure values within safe limits. Use special care when welding painted or coated steels since hazardous substances from the coating may be emitted. Ensure sufficient ventilation, local exhaust, or both, to keep welding fumes and gases from breathing zone and general area.
- **Personal protective equipment:** Wear appropriate eye protection to prevent eye contact. Wear appropriate personal protective clothing to prevent skin contact.

Section 9 - Physical and Chemical Properties

9(a) Appearance (physical state, color, etc.): Solid, non-volatile with varying color.

9(b) Odor: Odorless

9(c) Odor Threshold: NA

9(d) pH: NA

9(e) Melting Point/Freezing Point: >1000°C / >1800°F

9(f) Initial Boiling Point and Boiling Range: NA

9(g) Flash Point: NA

9(h) Evaporation Rate: NA

9(i) Flammability (solid, gas): NA

NA - Not Applicable

9(j) Upper/lower Flammability or Explosive Limits: NA

9(k) Vapor Pressure: NA

9(l) Vapor Density (Air = 1): NA

9(m) Relative Density: NA

9(n) Solubility(ies): NA

9(o) Partition Coefficient n-octanol/water: NA

9(p) Auto-ignition Temperature: NA

9(q) Decomposition Temperature: NA

9(r) Viscosity: NA

Section 10 - Stability and Reactivity

10(a) Reactivity: Contact with chemical substances like acids or strong bases could cause generation of gas.

10(b) Chemical Stability: Steel products are stable under normal storage and handling conditions.

10(c) Possibility of hazardous reaction: Not applicable

10(d) Conditions to Avoid: This product is only intended for normal welding purposes.

10(e) Incompatible Materials: Not applicable

10(f) Hazardous Decomposition Products: When this product is used in a welding process, hazardous decomposition products would include those from the volatilization, reaction or oxidation of the materials listed in section 3 and those from the base metal and coating. The amount of fumes generated from this product varies with welding parameters and dimensions, but is generally no more than 5 to 10 g/kg consumable. Fumes from this product contain compounds of the following chemical elements. The rest is not analyzed, according to available standards.

Fume analysis in weight% :

- Fe <35
- Mn <15
- F <5
- Pb <0,5
- Cu <0,1
- Ni <0,1
- Cr <0,1

Other

Refer to applicable national exposure limits for fume compounds, including those exposure limits for fume compounds found in Section 8.

Manganese and nickel have a low exposure limit, in some countries, that may be easily exceeded.

Reasonably expected gaseous products would include carbon oxides, nitrogen oxides and ozone. Air contaminants around the welding area can be affected by the welding process and influence the composition and quantity of fumes and gases produced.

Section 11 - Toxicological Information

11(a) Information on toxicological effects: Inhalation of welding fumes and gases can be dangerous to your health. Classification of welding fumes is difficult because of varying base materials, coatings, air contamination and processes. The International Agency for Research on Cancer has classified welding fumes as possibly carcinogenic to humans (Group 2B).

11(b) Acute Effects:

- **Acute toxicity:** Acute toxicity: Overexposure to welding fumes may result in symptoms like metal fume fever, dizziness, nausea, dryness or irritation of the nose, throat or eyes.
- **Skin corrosion/irritation:** No data available
- **Respiratory/skin sensitization:** No data available
- **Germ cell mutagenicity:** No data available
- **Genotoxicity:** No data available
- **Carcinogenicity:** *This product contains substance(s) that may cause cancer, which is/are classified as Carcinogenic to humans as per IARC.
- **Repeated dose toxicity:** No data available
- **Reproductive toxicity:** No data available
- **STOT-single exposure:** No data available
- **STOT-repeated exposure:** No data available
- **Aspiration hazard:** No data available

- **LD50 Oral:** No data available
- **LD50 Dermal:** No data available
- **LC50 Inhalation** No data available
- **Routes of exposure:** No data available
- **Toxicity in case of skin contact:** No data available
- **Toxicity in case of eye contact:** No data available
- **Toxicity in case of ingestion:** No data available

11(c) Long term Effects:

- **Chronic toxicity:** Overexposure to welding fumes may affect pulmonary function. 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. Prolonged inhalation of titanium dioxide above safe exposure limits can cause cancer.

Section 12 - Ecological Information**12(a) Toxicity**

- **Acute toxicity:** No data available
- **Toxicity:** No data available
- **Aquatic:** No data available
- **Soil:** No data available
- **Acute fish toxicity:** No data available
- **Acute algae toxicity:** No data available
- **Acute crustacean toxicity:** No data available
- **Chronic toxicity:** This product contains cobalt, which is classified by CLP Directive Regulation (EC) No 1272/2008, as toxic to aquatic organisms and may cause long-term adverse effects in the aquatic environment.

12(b) Persistence and degradability

- **Persistence and degradability:** No data available
- **Decay/transformation:** No data available

12(c) Bioaccumulative potential

- **Bioaccumulative potential:** No data available

12(d) Mobility in soil

- **Mobility:** No data available

12(e) Results of PBT and vPvB assessment

- **Results of PBT and vPvB assessment:** No data available

12(f) Other adverse effects

- **Other adverse effects:** No data available

Other Information:

Welding consumables and materials could degrade/weather into components originating from the consumables or from the materials used in the welding process. Avoid exposure to conditions that could lead to accumulation in soils or groundwater.

Section 13 - Disposal Considerations

Disposal: Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with federal and local regulations. Use recycling procedures if available. USA RCRA: This product is not considered hazardous waste if discarded. Residues from welding consumables and processes could degrade and accumulate in soils and groundwater. Welding slag from this product typically contains mainly the following components originating from the powder filling of the flux-cored wire.

Slag analysis in %:

Al₂O₃ <5

SiO₂ <10

F <2

Fe₂O₃ <5

MgO <10

MnO <15

TiO₂ <65

Section 14 - Transport Information

14 (a-g) Transportation Information:

| | | |
|--|---|--|
| Shipping Name: Not Applicable (NA) Shipping Symbols: NA Hazard Class: NA UN No.: NA Packing Group: NA DOT/ IMO Label: NA Special Provisions (172.102): NA | Packaging Authorizations a) Exceptions: NA b) Group: NA c) Authorization: NA | Quantity Limitations a) Passenger, Aircraft, or Railcar: NA b) Cargo Aircraft Only: NA Vessel Stowage Requirements a) Vessel Stowage: NA b) Other: NA DOT Reportable Quantities: NA |
|--|---|--|

International Maritime Dangerous Goods (IMDG) and the Regulations Concerning the International Carriage of Dangerous Goods by Rail (RID) classification, packaging and shipping requirements follow the US DOT Hazardous Materials Regulation.

| | | |
|--|--|---|
| Shipping Name: Not Applicable (NA) Classification Code: NA UN No.: NA Packing Group: NA ADR Label: NA Special Provisions: NA Limited Quantities: NA | Packaging a) Packing Instructions: NA b) Special Packing Provisions: NA c) Mixed Packing Provisions: NA | Portable Tanks & Bulk Containers a) Instructions: NA b) Special Provisions: NA |
|--|--|---|

International Air Transport Association (IATA) does not regulate Flux cored wire for Hardox wear plate as a hazardous material.

| | | | | |
|---|--|---|---|--|
| Shipping Name: Not Applicable (NA) Class/Division: NA Hazard Label (s): NA UN No.: NA Packing Group: NA Excepted Quantities (EQ): NA | Passenger & Cargo Aircraft Limited Quantity (EQ) Pkg Inst: NA Max Net Qty/Pkg: NA | Pkg Inst: NA Max Net Qty/Pkg: NA | Cargo Aircraft Only Pkg Inst: NA Max Net Qty/Pkg: NA | Special Provisions: NA ERG Code: NA |
|---|--|---|---|--|

Pkg Inst – Packing Instructions

Max Net Qty/Pkg – Maximum Net Quantity per Package

ERG – Emergency Response Drill Code

Transport Dangerous Goods (TDG) Classification: Flux cored wire for Hardox wear plate does not have a TDG classification.

Other: The European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR).

Section 15 - Regulatory Information

15(a) Safety, health and environmental regulations/legislation specific for the substance or mixture EU Regulations:

Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.

Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 Commission Regulation (EU) 2015/830 of 28 May 2015 amending Regulation (EC) No 1907/2006 of the European Parliament and the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

DIRECTIVE 2008/98/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL. of 19 November 2008.

on waste and repealing certain Directives.

European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste.

Other regulations, limitations and legal regulations

Poland Regulations:

ACT of 25 February 2011 on the chemical substances and their mixtures(OJ # 63, poz. 322).

Regulation of the Minister of Labour and Social Policy of 6 June 2014 on Maximum Permissible Concentration and Intensity of Agents Harmful to Health in the Working Environment (Dz. u. z. 2014, poz 817).

The Act on Waste of 14 December 2012, Journal of Laws of 2013, item 21 with amendments

Act of 13th June 2013 on packaging management and packaging waste (Journal of Laws of 2013, item 888).

Regulation of the Minister of the Environment of 9 December 2014 on waste catalogue (Journal of Laws of 2014, item 1923).

Regulation of the Minister of Economy of 21 December 2005. Concerning essential requirements for personal protective equipment (Journal. Laws No. 259, item. 2173).

Regulation of the Minister of Health of 2 February 2011 on tests and measurements of factors harmful to health in the working environment (the Journal of Laws 2011, no. 33, item 166).

USA Regulations :

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

CERCLA/SARA Title III Reportable Quantities (RQs) and/or Threshold Planning Quantities (TPQs): 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 your Local Emergency Planning Committee.

EPCRA/SARA Title III 313 Toxic Chemicals: The following metallic components are listed as SARA 313 "Toxic Chemicals" and potential subject to annual SARA 313 reporting. See Section 3 for weight percent.
Manganese: 1.0% de minimis concentration

Canada: WHMIS classification: Class D; Division 2, Subdivision A

International Inventories:

Australia: The substance(s) in this product is/are in compliance with the inventory requirements of Australian Inventory of Chemical Substances (AICS)

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

This Safety Data Sheet complies with Annex II of 830/2015 amending EC No. 1907/2006, CLP directive 1272/2008, also in accordance with ISO 11014-1 and ANSI Z400.1

Canadian Environmental Protection Act (CEPA): All constituent(s) of this product is/are on the Domestic Substance List (DSL).

15(b) Chemical safety assessment

- **Chemical safety assessment:** Not available

Other

Read and understand the manufacturer's instructions, your employer's safety practices and the health and safety instructions on the label. Observe any federal and local regulations. Take precautions when welding and protect yourself and others.

WARNING: Welding fumes and gases are hazardous to your health and may damage lungs and other organs. Use adequate ventilation. ELECTRIC SHOCK can kill. ARC RAYS and SPARKS can injure eyes and burn skin.

Wear correct hand, head, eye and body protection.

Section 16 - Other Information

Disclaimer: This information is taken from sources or based upon data believed to be reliable. However, SSAB Americas and AM Health and Safety, Inc. make no warranty as to the absolute correctness or sufficiency of any of the foregoing or that additional or other measures may not be required under particular conditions.

Reference to key literature and data sources: Refer to Welding of Hardox® available from www.ssab.com/download-center

Additional information: USA: American National Standard Z49.1 Safety in Welding and Cutting, ANSI/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", 550 North Le Jeune Road, Miami Florida 33135. 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.

American Conference of Governmental Hygienists (ACGIH), Threshold Limit Values and Biological Exposure Indices, 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.

UK: WMA Publication 236 and 237, "Hazards from Welding fume", "The arc welder at work, some general aspects of health and safety".

Germany: Unfallverhütungsvorschrift BGV D1, "Schweißen, Schneiden und verwandte Verfahren".

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

This product has been classified according to the hazard criteria of the CPR and the SDS contains all of the information required by the CPR.

Phrase meaning:

Aquatic Chronic 4 - Hazardous to the aquatic environment — Chronic hazard category 4

Carc. 2 - Carcinogenicity, hazard category 2

Resp. Sens. 1 - Respiratory sensitisation, hazard category 1

Skin Sens. 1 - Skin sensitisation, hazard category 1

STOT RE 1 - Specific Target Organ Toxicity — Repeated exposure, hazard category 1

H332 – Harmful if inhaled.

H372 - Causes damage to organs through prolonged or repeated exposure.

H411 – Toxic to aquatic life with long lasting effects.

SSAB requests the users of this product to study this Safety Data Sheet (SDS) and become aware of product hazards and safety information. To promote safe use of this product a user should notify its employees, agents and contractors of the information on this SDS and any product hazards/safety information. Furnish this same information to each of its customers for the products.

Request such customers to notify employees and customers for the same product hazards and safety information.

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