HN 590

Safety Data Sheet

According to OSHA's Hazardous Communication Standard (HCS) 29 CFR § 1910.1200.
Issue date: 1/20/2026 Revision date: 1/20/2026 Supersedes: 1/20/2026 Version: 1.0

SECTION 1: Identification

1.1. Identification

Product form	:	Mixture
Trade name	:	HN 590
Product code	:	S6690
Type of product		Flux for Submerged Arc Welding

1.2. Recommended use and restrictions on use

Use of the substance/mixture	:	Arc Welding
Recommended use	:	Use only as indicated for welding operations
Restrictions on use	:	Use only as indicated for welding operations

1.3. Supplier

Manufacturer
Hobart Brothers LLC
101 Trade Square East
Troy, OH 45373
United States
T +1 (937) 332-5188
sds@hobartbrothers.com - www.hobartbrothers.com

Canadian address
Hobart Brothers LLC
2570 North Talbot Road
Old Castle, Ontario N0R1L0
Canada
T +1 (519) 737-3000

1.4. Emergency telephone number

Emergency number	:	+1 (800) 424-9300

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS US classification

The product 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), Canada's Hazardous Products Regulations and Mexico's Harmonized System for Identification and Communication of Hazards and Risks from Hazardous Chemicals in the Workplace.

Acute toxicity (oral), Category 4
Acute toxicity (inhalation:dust,mist), Category 4
Carcinogenicity, Category 2
Specific target organ toxicity — Repeated exposure, Category 2
Full text of H statements : see section 16

2.2. GHS Label elements, including precautionary statements

GHS US labeling

Hazard pictograms (GHS US) :

Signal word (GHS US) : Warning
Hazard statements (GHS US) : H302+H332 - Harmful if swallowed or if inhaled
H351 - Suspected of causing cancer.
H373 - May cause damage to organs through prolonged or repeated exposure

Precautionary statements (GHS US) : P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P260 - Do not breathe dust, fume, gas, mist, vapors, spray.
P264 - Wash hands, forearms and face 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, and hearing protection.
P301+P312 - If swallowed: Call a poison center or doctor if you feel unwell.
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing.
P308+P313 - If exposed or concerned: Get medical advice/attention.
P312 - Call a poison center or doctor if you feel unwell.
P314 - Get medical advice or attention if you feel unwell.
P330 - Rinse mouth.
P405 - Store locked up.
P501 - Dispose of contents and/or container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulations.

2.3. Other hazards which do not result in classification

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 of the materials shown in Section 3 of this Safety Data Sheet, plus those from the base metal and coating, etc. 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 elements and molecules from the components found in Section 3. 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 that 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, F1.3, and Z49.1, available from the American Welding Society (www.aws.org) 8669 NW 36 Street, #130, Miami, Florida 33166-6672, Phone: 800-443-9353 or 305-443-9353.

2.4. Unknown acute toxicity (GHS US)

No additional information available

SECTION 3: Composition/Information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	%	GHS US classification
MAGNESIUM OXIDE	CAS-No.: 1309-48-4	15 – 30	Not classified
ALUMINUM OXIDE	CAS-No.: 1344-28-1	15 – 30	Not classified
CALCIUM FLUORIDE	CAS-No.: 7789-75-5	10 – 20	Not classified

Name	Product identifier	%	GHS US classification
SODIUM SILICATE	CAS-No.: 1344-09-8	6 – 15	Acute Tox. 4 (Inhalation:dust,mist), H332 Skin Corr. 1, H314 Eye Dam. 1, H318
QUARTZ	CAS-No.: 14808-60-7	5 – 15	Carc. 1A, H350 STOT RE 1, H372
MANGANESE OXIDE	CAS-No.: 1344-43-0	1 – 5	Aquatic Acute 2, H401 Aquatic Chronic 2, H411
TITANIUM DIOXIDE	CAS-No.: 13463-67-7	1 – 5	Carc. 2, H351 Aquatic Acute 3, H402 Aquatic Chronic 3, H412
CALCIUM OXIDE	CAS-No.: 1305-78-8	1 – 5	Skin Corr. 1, H314 Eye Dam. 1, H318 STOT SE 3, H335 Aquatic Acute 3, H402 Aquatic Chronic 3, H412
POTASSIUM SILICATE	CAS-No.: 1312-76-1	≤ 5	Acute Tox. 4 (Inhalation:dust,mist), H332
MANGANESE	CAS-No.: 7439-96-5	≤ 3	Aquatic Acute 2, H401 Aquatic Chronic 2, H411
SILICON	CAS-No.: 7440-21-3	≤ 2	Not classified

Full text of hazard classes and H-statements : see section 16

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures general : To avoid 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. If no detectable pulse, begin Cardiopulmonary Resuscitation (CPR). Call emergency physician to the scene of the accident.

First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. If breathing is difficult, provide fresh air and contact physician immediately. If breathing has stopped, perform artificial respiration until medical assistance arrives.

First-aid measures after skin contact : Remove contaminated clothing and wash the skin thoroughly with soap and water. If symptoms develop, seek medical attention at once. . Wash skin with plenty of water.

First-aid measures after eye contact : Dust of the product or fume generated in use of 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. Rinse eyes with water as a precaution.

First-aid measures after 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. Call a poison center/doctor/physician if you feel unwell.

4.2. Most important symptoms and effects (acute and delayed)

Symptoms/effects after inhalation : Dust of the product, if present, may cause respiratory irritation after an excessive inhalation exposure. Although no appropriate human or animal health effects data are known to exist, this material is expected to be an inhalation hazard. Refer to section 11 for more information.

Symptoms/effects after skin contact : None under normal conditions. Dust may cause irritation in skin folds or by contact in combination with tight clothing.
Symptoms/effects after eye contact : None under normal conditions. Dust from this product may cause eye irritation.
Symptoms/effects after ingestion : None under normal conditions.

4.3. Immediate medical attention and special treatment, if necessary

Treat symptomatically.

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media : This product is essentially nonflammable until welded; therefore, use a suitable extinguishing agent for a surrounding fire. Water spray. Dry powder. Foam.
Unsuitable extinguishing media : None known.

5.2. Specific hazards arising from the chemical

Fire hazard : As shipped, this product is nonflammable, non-explosive and essentially nonhazardous until welded.
Explosion hazard : No direct explosion hazard.
Hazardous decomposition products in case of fire : Welding arcs and sparks can ignite combustibles and flammable products.
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 and National Fire Protection Association (NFPA) 51B for further general safety information on the use and handling of welding consumables and associated procedures.

5.3. Special protective equipment and precautions for fire-fighters

Firefighting instructions : Fight fire from safe distance and protected location. Do not enter fire area without proper protective equipment, including respiratory protection.
Protection during firefighting : Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : If airborne dust and/or fume is present, use adequate engineering controls to prevent overexposure. Notify authorities if product enters sewers or public waters. Absorb spillage to prevent material-damage.

6.1.1. For non-emergency personnel

Protective equipment : Wear recommended personal protective equipment, ensure adequate ventilation, and ensure air handling systems are operational.
Emergency procedures : Ventilate spillage area.

6.1.2. For emergency responders

Protective equipment : Do not attempt to take action without suitable protective equipment. For further information, refer to Section 8.
Emergency procedures : Evacuate unnecessary personnel.

6.2. Environmental precautions

Avoid release to the environment. Should not be released into the environment. Prevent from reaching drains, sewer or waterway.

6.3. Methods and material for containment and cleaning up

For containment : Absorb with sand or other inert absorbent.

Methods for cleaning up : Mechanically recover the product. Sweep or scoop up solid material while minimizing dust generation.

Other information : Wear protective eye wear, gloves and clothing when handling these materials. Dispose of contents/container in accordance with local regulations. Dispose of materials or solid residues at an authorized site.

6.4. Reference to other sections

Refer to Section 8 and Section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed : Not expected to present a significant hazard under anticipated conditions of normal use.

Precautions for safe handling : Ensure good ventilation of the work station.
Wear personal protective equipment.
Use appropriate personal protective equipment (see Section 8). Use only with adequate ventilation. Prevent generation of combustible dust in air mixtures. Avoid breathing dust. Do not eat, drink, smoke or use personal products when handling chemical substances. Wear gloves when handling welding consumables. Wash thoroughly after handling. Avoid breathing welding fumes and gases, they may be dangerous to your health.

Hygiene measures : Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Keep in a cool, well-ventilated place away from heat.

Storage conditions : Keep container tightly sealed, keep container dry, store in a cool, well-ventilated area, keep separate from acids and strong bases to prevent possible chemical reactions.

Packaging materials : Always store product in original container. If original container is damaged or destroyed, store in container of same material as original container.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

MANGANESE (7439-96-5)	
USA - ACGIH - Occupational Exposure Limits	
Local name	Manganese, elemental and inorganic compounds, as Mn
ACGIH® TLV® TWA	0.02 mg/m³ (Respirable fraction) 0.1 mg/m³ (Inhalable fraction)
Remark (ACGIH®)	TLV® Basis: CNS impair. Notations: A4 (Not classifiable as a Human Carcinogen)
Regulatory reference	ACGIH 2025
USA - OSHA - Occupational Exposure Limits	
Local name	Manganese
OSHA PEL C	5 mg/m³ compounds (as Mn) 5 mg/m³ fume (as Mn)
Regulatory reference (US-OSHA)	OSHA Annotated Table Z-1

SILICON (7440-21-3)	
USA - OSHA - Occupational Exposure Limits	
Local name	Silicon
OSHA PEL TWA	15 mg/m³ (Total dust) 5 mg/m³ (Respirable fraction)
Regulatory reference (US-OSHA)	OSHA Annotated Table Z-1

CALCIUM FLUORIDE (7789-75-5)	
USA - ACGIH - Occupational Exposure Limits	
ACGIH® TLV® TWA	2.5 mg/m³

MAGNESIUM OXIDE (1309-48-4)	
USA - ACGIH - Occupational Exposure Limits	
ACGIH® TLV® TWA	10 mg/m³ (Inhalable fraction)

ALUMINUM OXIDE (1344-28-1)	
USA - ACGIH - Occupational Exposure Limits	
ACGIH® TLV® TWA	1 mg/m³ (Respirable fraction)

QUARTZ (14808-60-7)	
USA - ACGIH - Occupational Exposure Limits	
ACGIH® TLV® TWA	0.025 mg/m³ (Respirable fraction)

MANGANESE OXIDE (1344-43-0)	
USA - ACGIH - Occupational Exposure Limits	
ACGIH® TLV® TWA	0.02 mg/m³ (Respirable fraction) 0.1 mg/m³ (Inhalable fraction)

TITANIUM DIOXIDE (13463-67-7)	
USA - ACGIH - Occupational Exposure Limits	
Local name	Titanium dioxide
ACGIH® TLV® TWA	2.5 mg/m³ Respirable finescale particles 0.2 mg/m³ Respirable nanoscale particles
Remark (ACGIH®)	TLV® Basis: LRT irr; pneumoconiosis. Notations: A3 (Confirmed Animal Carcinogen with Unknown Relevance to Humans)
Regulatory reference	ACGIH 2025
USA - OSHA - Occupational Exposure Limits	
Local name	Titanium dioxide (Total dust)
OSHA PEL TWA	15 mg/m³
Regulatory reference (US-OSHA)	OSHA Annotated Table Z-1

CALCIUM OXIDE (1305-78-8)	
USA - ACGIH - Occupational Exposure Limits	
Local name	Calcium oxide
ACGIH® TLV® TWA	2 mg/m³
Remark (ACGIH®)	TLV® Basis: Eye, URT & Skin irr

CALCIUM OXIDE (1305-78-8)	
Regulatory reference	ACGIH 2025
USA - OSHA - Occupational Exposure Limits	
Local name	Calcium oxide
OSHA PEL TWA	5 mg/m³
Regulatory reference (US-OSHA)	OSHA Annotated Table Z-1

8.2. Appropriate engineering controls

Appropriate engineering controls : Use enough ventilation or local exhaust at the arc or both to keep the fumes and gases below exposure limits in Section 8.1, in the worker's breathing zone and the general area. Ensure good ventilation of the work station.

Environmental exposure controls : Avoid release to the environment.

8.3. Individual protection measures/Personal protective equipment

Personal protective equipment:
Wear recommended personal protective equipment.

Materials for protective clothing:

Wear hand, head and body protection that 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.

Hand protection:

Protective gloves

Eye protection:

Wear helmet or use face shield with filter lens for open arc welding processes. See ANSI Z49.1. As a rule of thumb, begin with Shade Number 14. Adjust if needed by selecting the next lighter or darker shade number. Provide protective screens and flash goggles, if necessary, to shield others from the weld arc flash. Safety glasses

Type	Field of application	Characteristics
Welding mask, Full face respirator		

Skin and body protection:

Wear suitable protective clothing. Wear hand, head and body protection that 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.

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. Train the welder to keep his head out of the fumes.

Personal protective equipment symbol(s):

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Solid
Color	:	Brown-grey
Odor	:	Not applicable
Odor threshold	:	No data available
pH	:	No data available
Melting point	:	No data available
Freezing point	:	Not applicable
Boiling point	:	No data available
Flash point	:	Not applicable
Relative evaporation rate (butyl acetate=1)	:	No data available
Flammability (solid, gas)	:	Non flammable.
Vapor pressure	:	No data available
Relative vapor density at 20°C	:	No data available
Relative density	:	No data available
Solubility	:	No data available
Partition coefficient n-octanol/water (Log Pow)	:	No data available
Auto-ignition temperature	:	Not applicable
Decomposition temperature	:	No data available
Viscosity, kinematic	:	Not applicable
Viscosity, dynamic	:	No data available
Explosion limits	:	Not applicable
Explosive properties	:	No data available
Oxidizing properties	:	No data available

9.2. Other information

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

SECTION 10: Stability and reactivity

10.1. Reactivity

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

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

GENERAL: This welding consumable is 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.

10.4. Conditions to avoid

None under recommended storage and handling conditions. See Section 7.

10.5. Incompatible materials

Strong acids, strong bases, strong oxidizing agents, and strong reducing agents.

10.6. Hazardous decomposition products

Hazardous decomposition products when this product is used in a welding process would include those from the volatilization, reaction, or oxidation of the components in Section 3 and those of the base metal, including plating or coatings like galvanizing. Use industrial hygiene monitoring to ensure that your use of this material does not create exposures that exceed regulatory limits. Always use enough exhaust ventilation to maintain exposure below regulatory limits. Refer to the following sources for important additional information: American National Standard Institute (ANSI) Z49.1; Safety in Welding, Cutting and Allied Processes published by the American Welding Society, 8669 NW 36 Street, # 130, Miami, Florida 33166-6672, Phone: 800-443-9353 or 305-443-9353; and OSHA Publication 2206 (29 CFR 1910), U.S. Government Printing Office, Washington, DC 2040.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral) : Harmful if swallowed.

Acute toxicity (dermal) : Exposure to welding fumes and gases during use of product can result in eye, nose and throat irritation, dizziness, and nausea. Workers in the area who experience these symptoms should leave the area immediately, seek fresh air and obtain medical attention. See Section 4 of this SDS for detailed information.

Acute toxicity (inhalation) : Inhalation of welding fumes and gases can be dangerous to your health. Welding fumes can be difficult to classify due to the variety of potential base materials, coatings, air contaminants and welding processes. Always use adequate ventilation. Always use appropriate personal protective equipment. Short-term (acute) overexposure effects - welding fumes, may result in discomfort such as dizziness, nausea or dryness or irritation of nose, throat or eyes.
Manganese, Manganese 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.

Chronic toxicity (Inhalation) : Overexposure to respirable crystalline silica, which may be present in dust created from the processing, handling or use of this product, can cause severe lung damage (silicosis). Respiratory overexposure to airborne crystalline silica is known to cause silicosis, a form of disabling pulmonary fibrosis which can be progressive and may lead to death. Crystaline silica is on the IARC (International Agency for Research on Cancer) and NTP (National Toxicology Program) lists as posing a cancer risk to humans.
Long-term (chromic) overexposure to welding fumes, excess levels may cause bronchial asthma, lung fibrosis, pneumoconiosis or siderosis. Studies have shown that there is sufficient evidence of ocular melanoma in welders.
Manganese, manganese oxide – Long-term overexposure to manganese compounds may affect the central nervous system. Symptoms 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, see Section 8.1.

HN 590	
ATE US (oral)	500 mg/kg body weight
ATE US (dust, mist)	1.5 mg/l/4h

MANGANESE (7439-96-5)	
LD50 oral rat	> 2000 mg/kg body weight (OECD 420: Acute Oral toxicity – Acute Toxic Class Method, Rat, Female, Experimental value, Oral, 14 day(s))
LC50 Inhalation - Rat	> 5.14 mg/l (OECD 403: Acute Inhalation Toxicity, 4 h, Rat, Male / female, Experimental value, Inhalation (dust), 14 day(s))
LC50 Inhalation - Rat (Dust/Mist)	> 5.14 mg/l Source: ECHA

CARBON MONOXIDE (630-08-0)	
ATE US (gases)	700 ppmV/4h
SILICON (7440-21-3)	
LD50 oral rat	> 5000 mg/kg body weight (OECD 401: Acute Oral Toxicity, Rat, Male / female, Read-across, Oral, 14 day(s))
LD50 dermal rabbit	> 5000 mg/kg body weight (24 h, Rabbit, Read-across, Dermal, 14 day(s))
CALCIUM FLUORIDE (7789-75-5)	
LD50 oral rat	> 2000 mg/kg body weight (OECD 423: Acute Oral Toxicity – Acute Toxic Class Method, Rat, Female, Experimental value, Oral, 14 day(s))
LD50 dermal rat	> 2000 mg/kg body weight (EPA OPP 81-2, 24 h, Rat, Male / female, Experimental value, Dermal, 14 day(s))
LC50 Inhalation - Rat	> 5.07 mg/l air (OECD 403: Acute Inhalation Toxicity, 4 h, Rat, Male / female, Experimental value, Inhalation (dust), 14 day(s))
MAGNESIUM OXIDE (1309-48-4)	
LD50 oral rat	> 5000 mg/kg (Rat, Literature study, Oral)
LD50 dermal rabbit	> 2000 mg/kg body weight (Rabbit, Literature study, Dermal)
ALUMINUM OXIDE (1344-28-1)	
LD50 oral rat	> 15900 mg/kg body weight (Equivalent or similar to OECD 401, Rat, Male / female, Experimental value, Oral, 14 day(s))
LC50 Inhalation - Rat	> 2.3 mg/l air (Equivalent or similar to OECD 403, 4 h, Rat, Male / female, Experimental value, Inhalation (aerosol), 14 day(s))
SODIUM SILICATE (1344-09-8)	
LD50 oral rat	> 2000 mg/kg (Rat, Oral)
LD50 dermal rat	> 5000 mg/kg body weight Animal: rat, Guideline: EPA OPPTS 870.1200 (Acute Dermal Toxicity)
LC50 Inhalation - Rat	> 2.06 mg/l air Animal: rat, Guideline: EPA OPPTS 870.1300 (Acute inhalation toxicity)
ATE US (dust, mist)	1.5 mg/l/4h
MANGANESE OXIDE (1344-43-0)	
LD50 oral rat	> 2000 mg/kg body weight (OECD 420: Acute Oral toxicity – Acute Toxic Class Method, Rat, Female, Experimental value, Oral, 14 day(s))
LC50 Inhalation - Rat	> 5.35 mg/l (OECD 403: Acute Inhalation Toxicity, 4 h, Rat, Male / female, Experimental value, Inhalation (dust), 14 day(s))
LC50 Inhalation - Rat (Dust/Mist)	> 5.35 mg/l Source: ECHA
TITANIUM DIOXIDE (13463-67-7)	
LD50 oral rat	> 5000 mg/kg body weight (OECD 425: Acute Oral Toxicity: Up-and-Down Procedure, Rat, Female, Experimental value, Oral, 14 day(s))
LC50 Inhalation - Rat	5.09 mg/l (OECD 403: Acute Inhalation Toxicity, 4 h, Rat, Male, Experimental value, Inhalation (dust), 14 day(s))
LC50 Inhalation - Rat (Dust/Mist)	> 6.82 mg/l Source: ECHA
ATE US (vapors)	5.09 mg/l/4h
ATE US (dust, mist)	5.09 mg/l/4h

CALCIUM OXIDE (1305-78-8)	
LD50 oral rat	> 2000 mg/kg body weight (OECD 425: Acute Oral Toxicity: Up-and-Down Procedure, Rat, Female, Experimental value, Oral, 14 day(s))
LD50 dermal rat	> 2000 mg/kg body weight Animal: rat, Guideline: OECD Guideline 402 (Acute Dermal Toxicity), Guideline: EU Method B.3 (Acute Toxicity (Dermal))
LD50 dermal rabbit	> 2500 mg/kg body weight (EU Method B.3: Acute toxicity (dermal), 24 h, Rabbit, Male / female, Experimental value, Dermal, 14 day(s))
LC50 Inhalation - Rat	> 6.04 mg/l (OECD 436: Acute inhalation toxicity-acute toxic class method, 4 h, Rat, Male / female, Experimental value, Inhalation (dust), 15 day(s))

POTASSIUM SILICATE (1312-76-1)	
LD50 oral rat	5700 mg/kg Source: SIDS
LD50 dermal rat	> 5000 mg/kg body weight Animal: rat, Guideline: EPA OPPTS 870.1200 (Acute Dermal Toxicity)
LC50 Inhalation - Rat	> 2.06 mg/l air Animal: rat, Guideline: EPA OPPTS 870.1300 (Acute inhalation toxicity)
ATE US (oral)	5700 mg/kg body weight
ATE US (dust, mist)	1.5 mg/l/4h

Skin corrosion/irritation : Not classified

Serious eye damage/irritation : Not classified

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Suspected of causing cancer.

Welding fumes	
IARC group	1 - Carcinogenic to humans

Ultraviolet radiation	
IARC group	1 - Carcinogenic to humans

TITANIUM DIOXIDE (13463-67-7)	
IARC group	2B - Possibly carcinogenic to humans

Reproductive toxicity : Not classified

STOT-single exposure : Not classified

CALCIUM OXIDE (1305-78-8)	
STOT-single exposure	May cause respiratory irritation.

STOT-repeated exposure : May cause damage to organs through prolonged or repeated exposure.

CARBON MONOXIDE (630-08-0)	
STOT-repeated exposure	Causes damage to organs through prolonged or repeated exposure.

SILICON (7440-21-3)	
NOAEL (oral,rat,90 days)	> 5000 mg/kg body weight Animal: rat, Animal sex: male

QUARTZ (14808-60-7)	
STOT-repeated exposure	Causes damage to organs through prolonged or repeated exposure.

CALCIUM OXIDE (1305-78-8)	
NOAEL (oral,rat,90 days)	1000 mg/kg body weight Animal: rat, Guideline: OECD Guideline 422 (Combined Repeated Dose Toxicity Study with the Reproduction / Developmental Toxicity Screening Test)

Aspiration hazard	:	Not classified
Viscosity, kinematic	:	Not applicable
Likely routes of exposure	:	Inhalation. Skin and eye contact.
Symptoms/effects after inhalation	:	Dust of the product, if present, may cause respiratory irritation after an excessive inhalation exposure. Although no appropriate human or animal health effects data are known to exist, this material is expected to be an inhalation hazard. Refer to section 11 for more information.
Symptoms/effects after skin contact	:	None under normal conditions. Dust may cause irritation in skin folds or by contact in combination with tight clothing.
Symptoms/effects after eye contact	:	None under normal conditions. Dust from this product may cause eye irritation.
Symptoms/effects after ingestion	:	None under normal conditions.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : Welding processes can release fumes directly to the environment. Welding wire can degrade if left outside and unprotected. Residues from welding consumables and processes can degrade and accumulate in the soil and groundwater.

MANGANESE (7439-96-5)	
LC50 - Fish [1]	> 3.6 mg/l (OECD 203: Fish, Acute Toxicity Test, 96 h, Oncorhynchus mykiss, Semi-static system, Fresh water, Experimental value)
EC50 - Crustacea [1]	> 1.6 mg/l (OECD 202: Daphnia sp. Acute Immobilisation Test, 48 h, Daphnia magna, Static system, Fresh water, Experimental value)
EC50 72h - Algae [1]	4.5 mg/l Test organisms (species): Desmodesmus subspicatus (previous name: Scenedesmus subspicatus)
EC50 72h - Algae [2]	2.8 mg/l Test organisms (species): Desmodesmus subspicatus (previous name: Scenedesmus subspicatus)
ErC50 algae	4.5 mg/l (OECD 201: Alga, Growth Inhibition Test, 72 h, Desmodesmus subspicatus, Static system, Fresh water, Experimental value)
NOEC (chronic)	1.7 mg/l Test organisms (species): Ceriodaphnia dubia Duration: '8 d'

SILICON (7440-21-3)	
LC50 - Fish [1]	> 100 mg/l (Pisces, Read-across)
EC50 72h - Algae [1]	≈ 250 mg/l Test organisms (species): Raphidocelis subcapitata (previous names: Pseudokirchneriella subcapitata, Selenastrum capricornutum)
ErC50 algae	250 mg/l (Equivalent or similar to OECD 201, 72 h, Pseudokirchneriella subcapitata, Static system, Fresh water, Read-across)

CALCIUM FLUORIDE (7789-75-5)	
LC50 - Fish [1]	164.5 ppm (EPA 600/3-75/009, 96 h, Salmo trutta, Static system, Fresh water, Experimental value, Fluorine ion)
EC50 72h - Algae [1]	> 100 mg/l Test organisms (species): Raphidocelis subcapitata (previous names: Pseudokirchneriella subcapitata, Selenastrum capricornutum)
EC50 96h - Algae [1]	7444.076 mg/l Source: Ecological Structure Activity Relationships

ALUMINUM OXIDE (1344-28-1)	
LC50 - Fish [1]	> 100 mg/l (96 h, Salmo trutta, Literature study)
EC50 - Crustacea [1]	> 100 mg/l (48 h, Daphnia magna, Literature study)

SODIUM SILICATE (1344-09-8)	
LC50 - Fish [1]	210 mg/l (96 h, Brachydanio rerio, Pure substance)
EC50 - Crustacea [1]	216 mg/l (96 h, Daphnia magna, Pure substance)
EC50 - Crustacea [2]	160 mg/l (96 h, Amphipoda)
EC50 72h - Algae [1]	345 mg/l Source: SIDS
EC50 72h - Algae [2]	> 345.4 mg/l Test organisms (species): Desmodesmus subspicatus (previous name: Scenedesmus subspicatus)

MANGANESE OXIDE (1344-43-0)	
LC50 - Fish [1]	> 100 mg/l (OECD 203: Fish, Acute Toxicity Test, 96 h, Oncorhynchus mykiss, Semi-static system, Fresh water, Experimental value, GLP)
EC50 - Crustacea [1]	> 4 mg/l (OECD 202: Daphnia sp. Acute Immobilisation Test, 48 h, Daphnia magna, Static system, Fresh water, Experimental value, GLP)
EC50 72h - Algae [1]	1.1 mg/l (OECD 201: Alga, Growth Inhibition Test, Desmodesmus subspicatus, Static system, Fresh water, Experimental value, GLP)
LOEC (chronic)	4.1 mg/l Test organisms (species): Ceriodaphnia dubia Duration: '8 d'
NOEC (chronic)	1.3 mg/l Test organisms (species): Ceriodaphnia dubia Duration: '8 d'
NOEC chronic fish	0.55 mg/l Test organisms (species): Salvelinus fontinalis Duration: '65 d'

TITANIUM DIOXIDE (13463-67-7)	
LC50 - Fish [1]	> 300 mg/l (Danio rerio, Fresh water, Literature study, Nominal concentration)
EC50 - Crustacea [1]	> 100 mg/l (OECD 202: Daphnia sp. Acute Immobilisation Test, 48 h, Daphnia magna, Static system, Fresh water, Experimental value, Locomotor effect)
EC50 - Other aquatic organisms [1]	> 100 mg/l Test organisms (species):
EC50 72h - Algae [1]	> 50 mg/l Source: ECHA
LOEC (chronic)	5 mg/l Test organisms (species): Daphnia magna Duration: '21 d'

CALCIUM OXIDE (1305-78-8)	
LC50 - Fish [1]	51 mg/l (OECD 203: Fish, Acute Toxicity Test, 96 h, Oncorhynchus mykiss, Static system, Fresh water, Read-across, GLP)
EC50 - Crustacea [1]	49 mg/l (OECD 202: Daphnia sp. Acute Immobilisation Test, 48 h, Daphnia magna, Static system, Fresh water, Read-across, Locomotor effect)
EC50 72h - Algae [1]	184.57 mg/l Test organisms (species): Raphidocelis subcapitata (previous names: Pseudokirchneriella subcapitata, Selenastrum capricornutum)
ErC50 algae	185 mg/l (OECD 201: Alga, Growth Inhibition Test, 72 h, Pseudokirchneriella subcapitata, Static system, Fresh water, Read-across, GLP)
NOEC (chronic)	32 mg/l Test organisms (species): Crangon septemspinosa Duration: '14 d'

POTASSIUM SILICATE (1312-76-1)	
LC50 - Fish [1]	301 – 478 mg/l
EC50 72h - Algae [1]	207 mg/l Test organisms (species): Desmodesmus subspicatus (previous name: Scenedesmus subspicatus)
EC50 72h - Algae [2]	207 mg/l Test organisms (species):

12.2. Persistence and degradability

HN 590	
Persistence and degradability	Not rapidly degradable

MANGANESE (7439-96-5)	
Persistence and degradability	Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable
ThOD	Not applicable
BOD (% of ThOD)	Not applicable

CARBON MONOXIDE (630-08-0)	
Persistence and degradability	Not rapidly degradable

Welding fumes	
Persistence and degradability	Not rapidly degradable

Ultraviolet radiation	
Persistence and degradability	Not rapidly degradable

SILICON (7440-21-3)	
Persistence and degradability	Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable (inorganic)
ThOD	Not applicable (inorganic)

CALCIUM FLUORIDE (7789-75-5)	
Persistence and degradability	Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable (inorganic)
ThOD	Not applicable (inorganic)

MAGNESIUM OXIDE (1309-48-4)	
Persistence and degradability	Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable (inorganic)
ThOD	Not applicable (inorganic)

ALUMINUM OXIDE (1344-28-1)	
Persistence and degradability	Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable (inorganic)
ThOD	Not applicable (inorganic)

SODIUM SILICATE (1344-09-8)	
Persistence and degradability	Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable
ThOD	Not applicable
BOD (% of ThOD)	Not applicable

QUARTZ (14808-60-7)	
Persistence and degradability	Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable (inorganic)
ThOD	Not applicable (inorganic)

MANGANESE OXIDE (1344-43-0)	
Persistence and degradability	Biodegradability in soil: not applicable, Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable
ThOD	Not applicable
BOD (% of ThOD)	Not applicable

TITANIUM DIOXIDE (13463-67-7)	
Persistence and degradability	Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable (inorganic)
ThOD	Not applicable (inorganic)

CALCIUM OXIDE (1305-78-8)	
Persistence and degradability	Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable (inorganic)
ThOD	Not applicable (inorganic)

POTASSIUM SILICATE (1312-76-1)	
Persistence and degradability	Not rapidly degradable

12.3. Bioaccumulative potential

MANGANESE (7439-96-5)	
Bioaccumulative potential	No bioaccumulation data available.

SILICON (7440-21-3)	
Bioaccumulative potential	Not bioaccumulative.

CALCIUM FLUORIDE (7789-75-5)	
BCF - Fish [1]	0 – 6.4 l/kg (OECD 305: Bioconcentration: Flow-Through Fish Test, 28 day(s), Cyprinus carpio, Fresh water, Experimental value, GLP)
Bioaccumulative potential	Low potential for bioaccumulation (BCF < 500).

MAGNESIUM OXIDE (1309-48-4)	
Bioaccumulative potential	Bioaccumulation: not applicable.

ALUMINUM OXIDE (1344-28-1)	
Bioaccumulative potential	Not bioaccumulative.

SODIUM SILICATE (1344-09-8)	
Bioaccumulative potential	No bioaccumulation data available.

QUARTZ (14808-60-7)	
Bioaccumulative potential	Not bioaccumulative.

MANGANESE OXIDE (1344-43-0)	
Bioaccumulative potential	Bioaccumulation: not applicable.

TITANIUM DIOXIDE (13463-67-7)	
Bioaccumulative potential	Not bioaccumulative.

CALCIUM OXIDE (1305-78-8)	
Bioaccumulative potential	Not bioaccumulative.

12.4. Mobility in soil

MANGANESE (7439-96-5)	
Ecology - soil	No (test)data on mobility of the substance available.

SILICON (7440-21-3)	
Surface tension	No data available in the literature
Ecology - soil	Low potential for adsorption in soil.

CALCIUM FLUORIDE (7789-75-5)	
Surface tension	No data available in the literature
Ecology - soil	No (test)data on mobility of the substance available.

MAGNESIUM OXIDE (1309-48-4)	
Surface tension	No data available in the literature
Ecology - soil	No (test)data on mobility of the substance available.

ALUMINUM OXIDE (1344-28-1)	
Surface tension	Not applicable (water solubility < 1 mg/l)
Ecology - soil	No (test)data on mobility of the substance available.

SODIUM SILICATE (1344-09-8)	
Ecology - soil	No (test)data on mobility of the component(s) available.

QUARTZ (14808-60-7)	
Ecology - soil	No (test)data on mobility of the substance available.

MANGANESE OXIDE (1344-43-0)	
Ecology - soil	Adsorbs into the soil.

TITANIUM DIOXIDE (13463-67-7)	
Surface tension	No data available in the literature
Ecology - soil	Low potential for mobility in soil.

CALCIUM OXIDE (1305-78-8)	
Surface tension	No data available in the literature
Ecology - soil	No (test)data on mobility of the substance available.

12.5. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Disposal methods

Regional waste regulation : Disposal must be done according to official regulations.
Waste treatment methods : Dispose of contents/container in accordance with licensed collector's sorting instructions.
Sewage disposal recommendations : Disposal must be done according to official regulations.
Product/Packaging disposal recommendations : Comply with applicable regulations for solid waste disposal. Disposal must be done according to official regulations.
Additional information : Do not re-use empty containers.

SECTION 14: Transport information

In accordance with DOT / TDG / IMDG / IATA

DOT	TDG	IMDG	IATA
14.1. UN number			
Not regulated	Not regulated	Not regulated	Not regulated
14.2. Proper Shipping Name			
Not regulated	Not regulated	Not regulated	Not regulated
14.3. Transport hazard class(es)			
Not regulated	Not regulated	Not regulated	Not regulated
14.4. Packing group			
Not regulated	Not regulated	Not regulated	Not regulated
14.5. Environmental hazards			
Not regulated	Not regulated	Not regulated	Not regulated
No supplementary information available			
14.6. Special precautions for user			
Not regulated	Not regulated	Not regulated	Not regulated

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. US Federal regulations

All components of this product are present and listed as Active on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory, or present below threshold value, except forthe following:

Welding fumes	CAS-No.	%
Ultraviolet radiation	CAS-No.	%
CALCIUM FLUORIDE	CAS-No. 7789-75-5	10 – 20%
MAGNESIUM OXIDE	CAS-No. 1309-48-4	15 – 30%
QUARTZ	CAS-No. 14808-60-7	5 – 15%
CALCIUM OXIDE	CAS-No. 1305-78-8	1 – 5%

Chemical(s) subject to the reporting requirements of Section 313 or Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986 and 40 CFR Part 372.		
MANGANESE	CAS-No. 7439-96-5	≤ 3%
ALUMINUM OXIDE	CAS-No. 1344-28-1	15 – 30%

15.2. International regulations

CANADA

MANGANESE (7439-96-5)

Listed on the Canadian DSL (Domestic Substances List)

CARBON MONOXIDE (630-08-0)

Listed on the Canadian DSL (Domestic Substances List)

SILICON (7440-21-3)

Listed on the Canadian DSL (Domestic Substances List)

ALUMINUM OXIDE (1344-28-1)

Listed on the Canadian DSL (Domestic Substances List)

SODIUM SILICATE (1344-09-8)

Listed on the Canadian DSL (Domestic Substances List)

MANGANESE OXIDE (1344-43-0)

Listed on the Canadian DSL (Domestic Substances List)

TITANIUM DIOXIDE (13463-67-7)

Listed on the Canadian DSL (Domestic Substances List)

POTASSIUM SILICATE (1312-76-1)

Listed on the Canadian DSL (Domestic Substances List)

National regulations

MANGANESE (7439-96-5)

Listed on INSQ (Mexican National Inventory of Chemical Substances)

CARBON MONOXIDE (630-08-0)

Listed on INSQ (Mexican National Inventory of Chemical Substances)

SILICON (7440-21-3)

Listed on INSQ (Mexican National Inventory of Chemical Substances)

ALUMINUM OXIDE (1344-28-1)

Listed on INSQ (Mexican National Inventory of Chemical Substances)

SODIUM SILICATE (1344-09-8)

Listed on INSQ (Mexican National Inventory of Chemical Substances)

MANGANESE OXIDE (1344-43-0)

Listed on INSQ (Mexican National Inventory of Chemical Substances)

TITANIUM DIOXIDE (13463-67-7)

Listed on IARC (International Agency for Research on Cancer)
Listed on INSQ (Mexican National Inventory of Chemical Substances)

POTASSIUM SILICATE (1312-76-1)

Listed on INSQ (Mexican National Inventory of Chemical Substances)

15.3. US State regulations

WARNING: This product can expose you to chemicals, including titanium dioxide, 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.

SECTION 16: Other information

According to OSHA's Hazardous Communication Standard (HCS) 29 CFR § 1910.1200.

Revision date : 1/20/2026

Other information : OSHA 29 CFR 1910, US Government Publishing Office, PO Box 979050, St. Louis, MO 63197-9000 or bookstore.gpo.gov.
USA: American National Standard Institute (ANSI) Z49.1 “Safety in Welding, Cutting and Allied Processes”, ANSI/AWS F1.1 “Method for Sampling Airborne Particles Generated by Welding and Allied Processes,” ANSI/AWS F1.6 "Guide for Estimating Welding Emissions for EPA and Ventilation Permit Reporting," ANSI/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.
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.
Threshold Limit Values and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists (ACGIH), 6500 Glenway Ave, Cincinnati, Ohio 45211, USA.
Canada: CSA Standard CAN/CSA-W117.2-01 “Safety in Welding, Cutting and Allied Processes”.

Full text of hazard classes and H-statements	
H302	Harmful if swallowed
H314	Causes severe skin burns and eye damage
H318	Causes serious eye damage
H332	Harmful if inhaled
H335	May cause respiratory irritation
H350	May cause cancer.
H351	Suspected of causing cancer.
H372	Causes damage to organs through prolonged or repeated exposure

Full text of hazard classes and H-statements	
H373	May cause damage to organs through prolonged or repeated exposure
H401	Toxic to aquatic life
H402	Harmful to aquatic life
H411	Toxic to aquatic life with long lasting effects
H412	Harmful to aquatic life with long lasting effects

HB Safety Data Sheet (SDS), USA

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 does not make any expressed or implied warranty as to this information.