SAFETY DATA SHEET **SAFE START CRUCIBLE**

1. Product and company identification

Product name:	Safe Start Crucible
Synonyms:	One Shot Crucible, Disposable Crucible, Degradable Crucible
Manufacturer:	ORGO-THERMIT Inc.
Division of:	THE GOLDSCHMIDT GROUP
Address:	3500 Colonial Drive North; Manchester, NJ 08759
Emergency phone:	CHEMTREC (Assistance 24 hours / 7 days a week) Toll Free: 1-800-424-9300 Local: +1-703-527-3887
Other calls:	(732) 657-5781
Fax:	(732) 657-5899
Product use:	A resin bonded refractory vessel used in rail welding to inititate, contain, and hold the liquid Thermit® steel and molten slag after the Thermit® reaction for a limited period of time.

2. Hazards identification

Hazard classification:

The product as shipped is not a hazardous chemical as defined in 29 CFR 1910.1200 – Hazard Communication.

Signal word:

No signal word is required because the product as shipped is not hazardous.

Hazard statement:

No hazard statement is required because the product as shipped is not hazardous.

Pictograms:

No pictograms are required on container labels because the product as shipped is not hazardous.

Precautionary statement:

No precautionary statement is required because the product as shipped is not hazardous.

Other hazard information:

The product as shipped is a resin bonded silica refractory with no respirable silica dust present. This product may release detectable amounts of formaldehyde vapor or other products of combustion because of thermal decomposition of the resin bonding during the Thermit® reaction. The smoke produced when ignited may irritate the eyes, skin and respiratory tract. Molten material produced after plain Thermit®

powder is ignited will cause serious thermal burns.

3. Composition/information on ingredients

This section lists ingredients contained in the product as shipped. The package contains a resin bonded refractory vessel with no odor or dust. The actual weight percentages of ingredients are considered trade secrets; therefore, ranges are presented.

Ingredient	Cas. No.	% WT
Crystalline Silica	14808-60-7	94 – 97 %
Phenolic resin	Not applicable	3 – 6 %
Ferric Oxide (<1.5 mm)	1309-37-1	< 0.1 %
Aluminum Powder (uncoated) (<0.8 mm)	7429-90-5	< 0.1 %

4. First aid measures

Eye contact:

If the article is broken or crushed the dust or particulates produced may cause irritation including pain, tearing, redness, and visual disturbance. Scratching of the cornea can occur if eye is rubbed. Fumes created when the Thermit® is ignited may be irritating. Bright light from Thermit® reaction may cause corneal burns.

In case dust or particulates get in eyes, immediately flush eye with plenty of water for at least 30 minutes; occasionally lifting the eyelids. Remove contact lenses if they are present; continue flushing with water. Do not allow victim to rub eyes nor keep eyes closed. Get medical attention if irritation persists.

Thermal or flash burns should be treated as medical emergencies.

Skin contact:

Dust or particulates if the article is crushed or broken may cause irritation due to abrasion. Some components in this product can cause an allergic reaction, possibly resulting in itching and skin eruptions. Diseases of the skin, such as dermatitis or eczema, may be aggravated by exposure. Contact with the molten metal will cause severe thermal burns.

In case of contact with dust or particulates, wash with soap and plenty of water. Get medical attention if irritation develops. If thermal burn occurs, seek immediate medical attention.

Ingestion:

Not expected to be acutely toxic via ingestion based on the physical and chemical properties of the product. Swallowing excessive amounts of dust may cause irritation, nausea, and diarrhea.

If excessive amounts of dust or particulates are swallowed, treat symptomatically and supportively. Get medical attention as needed.

Inhalation:

Dust from a crushed or broken crucible may cause irritation of the nose, throat, and lungs. Other symptoms include coughing, shortness of breath, wheezing, headache, drowsiness, dizziness, nausea, vomiting, muscle ache, pain, twitching, and convulsions. Best practice is to limit exposure to crystalline silica as long-term inhalation is hazardous.

Excessive inhalation of metallic fumes from the Thermit® reaction and dust may result in metal fume fever, an influenza-like illness. It is characterized by a sweet or metallic taste in the mouth, accompanied by dryness and irritation of the throat. Other symptoms include coughing, shortness of breath, pulmonary edema, general malaise, weakness, fatigue, muscle and joint pain, blurred vision, fever, and chills. Disorders of the respiratory system including asthma, bronchitis, and emphysema may be aggravated by exposure.

In case of overexposure to dust or fumes, move to fresh air. Loosen tight clothing such as collar, tie, belt, or waistband. If not breathing, provide rescue breathing or CPR. If breathing is difficult, seek medical evaluation.Get immediate medical attention if a fever with cough, chills, weakness, and general malaise develops. Nausea, vomiting, and muscle cramps could develop. Treatment should be symptomatic. This condition is self-limited in 24 – 48 hours.

5. Firefighting measures

Extinguishing media:

The vessel itself is a non-combustible solid. Once a reaction is initiated, do not use water, carbon dioxide, or foam on a fire involving a Thermit® reaction. Metal dust fires need to be smothered with dry silica sand or dry chemical powder (Class D extinguisher). If impossible to extinguish, call fire department, withdraw from area, protect surroundings, and allow fire to burn itself out.

Special firefighting procedures:

The vessel itself does not burn and is intended to contain any Thermit® reaction that has been initiated. As with any fire, firefighters should wear full firefighting turn-out gear and respiratory protection (self-contained breathing apparatus).

Unusual fire and explosion hazards:

Product contains a resin that if allowed to accumulate as dust on floors or machinery, could create a combustible dust explosion hazard. When using Thermit® Welding Powder in a Degradable Crucible, precautions should be taken to protect surrounding areas from catching fire from the Thermit® reaction. After ignition, the chemical reaction cannot be halted. May burn rapidly with flare burning effect. Molten slag and steel are produced – stay clear when reaction takes place. Reaction can reach over 4500 °F / 2500 °C.

Hazardous decomposition products:

This product has the potential to release formaldehyde vapor from thermal decomposition during the Thermit® reaction. When heated to decomposition, acid fumes are emitted. Do not use water or foam, as generation of explosive hydrogen gas may result. Chemical reaction with carbon dioxide may produce flammable methane gas.

6. Accidental release measures

If the crucible is broken or crushed, sweep the material into a disposal container. Avoid the generation of dust. Avoid inhalation of dust. Use dustless and/or non-dust generating methods for clean-up, such as a HEPA vacuum. Prevent entry into bodies of water.

Use proper personal protective equipment as indicated in Section 8. While cleaning, use a NIOSH/MSHA approved respirator for dust.

7. Handling and storage

Handling:
Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Avoid contact with eyes and skin. Minimize dust generation and accumulation. Avoid inhalation and ingestion of dust.

Storage:
Store in a cool, dry area away from incompatible substances. Keep away from moisture, humidity, and frost. Do not store in direct sunlight.

Other precautions:
Always keep crucible dry before and during use. Do not use material for rail welding that has gotten wet. While water does not affect the degradable crucible itself, the presence of water in a Thermit® reaction can result in violent reactions. Dispose of crucibles that have gotten wet.

8. Exposure controls/personal protection

Ingredient	ACGIH TLV	OSHA PEL	NIOSH
Crystalline Silica	0.025 mg/m^3	0.05 mg/m^3 (total)	0.05 mg/m^3
Iron Oxide	5 mg/m3	15 mg/m3 (total) 5 mg/m3 (resp)	<10 mg/m3
Aluminum	1 mg/m3	15 mg/m3 (total) 5 mg/m3 (resp)	10 mg/m3 (total) 5 mg/m3 (resp)

The listing above is a summary of elements used in the mixture. The exact percentage of alloying metals

is considered a trade secret. Information concerning hazardous exposure limits has been compiled from sources considered to be reliable and is accurate and reputable to the best of our knowledge and belief.

Engineering controls:

When using Thermit® powder, preventive fire protection measures should be employed to protect surrounding areas from catching fire. Depending on proximity and wind conditions, sparks could ignite nearby items. It is recommended to keep a dry chemical fire extinguisher and/or water supply nearby, but water should not be used on the Thermit® reaction.

Ventilation:

When conducting rail welding operations in an enclosed area, use local exhaust ventilation, or other engineering controls to keep airborne levels below the OSHA PEL's listed above. Hazardous emissions are maybe generated due to the thermal decomposition of the binder during pouring operations when crucibles are exposed to molten metal. Hazardous decomposition products may include carbon monoxide, carbon dioxide, benzene, aldehydes including formaldehyde, phenol, hydrogen cyanide, ammonia, or other organic compounds. Oxygen may be depleted by the Thermit® reaction during pouring operations if the operation takes place in a confined space. Hazardous particulate matter including crystalline silica, polycyclic organic compounds, soot, and smoke may be generated at concentrations approaching the Permissible Exposure Level during pouring, cooling, and especially shakeout operations. All the emissions may pose significant hazards and proper controls are necessary to protect the user from these emissions when operations take place in an enclosed space.

Respiratory protection:

Use a NIOSH/MSHA approved respirator during the Thermit® reaction and subsequent cooling and shakeout operations if exposure limits are exceeded, or if irritation or other symptoms are experienced. If oxygen depletion is possible due to operations in an enclosed space, an atmosphere supplying respirator must be used.

Eye protection:

Safety glasses or other appropriate eye protection should be used when using this product. When igniting Thermit® Welding Powder in a Degradable Crucible, shade 5 welding eye protection is recommended until the welding process is completed.

Skin protection:

Wear appropriate protective clothing, shoes, and gloves to prevent skin exposure. When igniting Thermit® Welding Powder in a Degradable Crucible, protect skin from high temperatures and sparks. Welding gloves, jackets, pants, bibs, or aprons are recommended for use during the welding process.

Other protective clothing or equipment:

Face shields and hard hats are used to protect users from sparks during the welding and grinding processes.

9. Physical and chemical properties

Appearance:	Off-white to pink sand core, with granular mixture gray in color in center of cap
Odour:	Odourless
Physical state:	Solid
pH as supplied:	Not available
Boiling point:	Not available
Melting point:	Cap starter material only > 1220 °F / 660 °C
Freezing point:	Not available
Vapor pressure (mmHg):	Not available
Vapor density (air = 1):	Not available
Specific gravity (H_2O = 1):	Vessel = 2.65 g/mL @ 20 °C; Cap starter = > 1g/mL @ 20 °C
Evaporation rate:	Not available
Solubility in water:	Very slightly soluble
Weight percent solids:	100 % Solids
Percent volatile:	Not available
Molecular weight:	Not available
Viscosity:	Not available
Flammable limits:	Not available
Flash point:	Not applicable
Autoignition temperature:	> 1830 ° F / 999 ° C

10. Stability and reactivity

Stability:	☒ STABLE ☐ UNSTABLE
Conditions to avoid (stability):	Does not spontaneously ignite. However, product contains a resin that if allowed to accumulate as dust on floors or machinery, could create a combustible dust explosion hazard.
Incompatibility (material to avoid):	Powerful oxidizers (i.e.: fluorine, chlorine trifluoride, manganese trioxide, oxygen difluoride, hydrogen peroxide, acetylene, ammonia).
Hazardous decomposition or by-products:	Silica will dissolve in hydrofluoric acid and produce a corrosive gas, silicon tetrafluoride. Hazardous decomposition products may include detectable

	amounts of carbon monoxide, carbon dioxide, benzene, aldehydes including formaldehyde, phenol, hydrogen cyanide, ammonia, benzo-pyrenes, particulates, or other organic compounds.
Hazardous polymerization:	Will not occur.
Conditions to avoid (polymerization):	Not applicable

11. Toxicological information

Routes of entry:

Crystalline silica poses considerable hazards with respect to long term inhalation. Formaldehyde and phenol, additional components of this product, also pose considerable hazards with respect to inhalation when using this product**.**

Chronic effects on humans:

Inhalation of respirable crystalline silica may result in silicosis. The respirable silica dust enters the lungs and causes the formation of scar tissue, thus reducing the lungs capability to take in oxygen. Crystalline silica (Respirable Size) is listed on the National Toxicology Program Report on Carcinogens and on the International Agency Research on Cancer (IARC) Monographs as a human lung carcinogen. The IARC has determined from a review of human and animal studies that there is sufficient evidence for the carcinogenicity of crystalline silica.

Inhalation of formaldehyde may result in increased risk of nasopharyngeal cancer. Formaldehyde is listed on the National Toxicology Program Report on Carcinogens and on the International Agency Research on Cancer (IARC) Monographs as a Group 1 carcinogen agent. The IARC has determined from a review of human and animal studies that there is sufficient evidence for the carcinogenicity of formaldehyde.

Excessive inhalation of metallic fumes and dust may result in metal fume fever, an influenza-like illness. It is characterized by a sweet or metallic taste in the mouth, accompanied by dryness and irritation of the throat. Other symptoms include coughing, shortness of breath, pulmonary edema, general malaise, weakness, fatigue, muscle and joint pain, blurred vision, fever and chills. Typically, symptoms will last 12 – 48 hours. Disorders of the respiratory system including asthma, bronchitis, and emphysema may be aggravated by exposure.

Other toxic effects on humans:

The substance may cause irritation of skin, mucous membranes, and upper respiratory tract.

Toxicity to animals:

Silica sand has caused lung cancer in animals. Formaldehyde has caused lung cancer in animals. Studies of phenol in animals have not revealed sufficient evidence of carcinogenicity.

12. Ecological information

Ecotoxicity (aquatic and terrestrial):

Ecological impact has not been determined.

13. Disposal considerations

Waste disposal method:

Check with all applicable local, regional, and national laws and regulations. Local regulations may be more stringent than regional or national regulation. It is the responsibility of the user to dispose of the material in the proper manner.

RCRA hazard class:

The product as shipped is not a Listed Hazardous Waste nor does it meet the criteria for a Characteristic Waste, but check with all applicable local, regional, and national laws and regulations. Local regulations may be more stringent than regional or national regulation. It is the responsibility of the user to dispose of the material in the proper manner.

14. Transport information

U.S. Department of Transportation

Proper shipping name:	SAFE START CRUCIBLE
Hazard class:	NOT APPLICABLE
ID number:	186630
Packing group:	NOT APPLICABLE
Label statements:	ITEM#186630 CLASS 55

Water transportation

Proper shipping name:	SAFE START CRUCIBLE
Hazard class:	NOT APPLICABLE
ID number:	186630
Packing group:	NOT APPLICABLE
Label statements:	ITEM#186630 CLASS 55

Air transportation

Proper shipping name:	SAFE START CRUCIBLE
Hazard class:	NOT APPLICABLE
ID number:	186630
Packing group:	NOT APPLICABLE

Label statements:	ITEM#186630 CLASS 55

Canada TDG:

Not regulated

15. Regulatory information

U.S. federal regulations

The product as shipped has not ingredients that are currently listed under EPCRA or CERCLA regulations**.**

CERCLA - Hazardous Substances:
None listed

EPCRA Section 313 – Toxic Chemicals:
CAS # 7429-90-5, Aluminium, is on the list as a fume or dust.

CAA 112(r) - Regulated Chemicals for Accidental Release Prevention:
None listed

State regulations:

New Jersey Right to Know Hazardous Substance List:
CAS # 14808-60-7, Silica - Quartz, is on the list.

CAS # 1309-37-1, Iron Oxide, is on the list.

CAS # 7429-90-5, Aluminium, is on the list.

California Proposition 65 List of Chemicals:
Crystalline silica is on the list.

16. Other information

NFPA hazard classification

Health:	1
Flammability:	1
Reactivity:	0
Other:	Use No Water.
Note:	NFPA classifications are 0 – 4, with 4 as the most severe.

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HMIS Hazard classification

Health:	1
Flammability:	0
Reactivity:	0
Other:	Safety glasses, gloves, dust respirator recommended.
Note:	HMIS classifications are 0 – 4, with 4 as the most severe.

HMIS	
HEALTH	1
FLAMMABILITY	1
REACTIVITY	0
PPE	E

Disclaimer:

Orgo-Thermit Inc. believes that the information herein is factual but is not intended to be all inclusive. The information relates only to the specific material designated and does not relate to its use in combination with other materials or its use as to any process. Because safety standards and regulations are subject to change and because Orgo-Thermit Inc. has no continuing control over such changes; those handling, storing, or using the material should satisfy themselves that they have current information regarding the way the material is handled, stored, used, or disposed of, and that the same is done in accordance with federal, state, and local law. Orgo-Thermit Inc. makes no warranty, expressed or implied, including (without limitation) warranties with respect to the completeness or continuing accuracy of the information contained herein, or with respect to fitness for any particular use.