

SAFETY DATA SHEET

Rail Welding Thermit®

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Thermit® Welding Powder
SYNONYMS: Thermite portion, Thermite reaction, Thermite powder, Alumino-thermic reaction, Goldschmidt reaction, Thermite welding, Exothermic welding

MANUFACTURER: **ORGO-THERMIT, Inc.**
DIVISION: **A Member of the Goldschmidt-Thermit-Group**
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PRODUCT USE: In-situ welding of steel rail road tracks with a coarse granular mixture of Aluminum, Iron Oxide Powder, Steel, and Solid Metal Alloy additions.

SECTION 2: HAZARDS IDENTIFICATION

HAZARD CLASSIFICATION:

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

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 smoke produced when ignited may irritate the eyes, skin, an respiratory tract. Molten material produced after Thermit® Welding Powder is ignited will cause serious thermal burns.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

This section lists ingredients contained in the product as shipped. The package contains silver, black, brown, red, and gray metal granules with no odor and some dust. The actual weight percentages of ingredients are considered trade secrets, therefore ranges or approximate values are included in the table below.

INGREDIENT	CAS NO.	% WT
Ferric Oxide	1309-37-1	>60%
Aluminum Powder (uncoated)	7429-90-5	10-30%
Ferro Manganese	12604-53-4	5 - 10%
Ferro Vanadium	12604-58-9	<1%
Ferro Molybdenum	14808-60-7	<1%
Mild Steel	7439-89-6	1 - 8%

SECTION 4: FIRST AID MEASURES

FIRST AID TREATMENT**EYE CONTACT:**

Dust or particulates may cause irritation including pain, tearing, and redness. Scratching of the cornea can occur if eye is rubbed. Fumes created when the Thermit® Welding Powder is ignited may be irritating. Bright light from Thermite reaction may cause corneal burns.

If eyes become irritated by dust or fumes, immediately flush eye with plenty of water for at least 15 minutes; occasionally lifting the eyelids. Do not rub eyes. Get medical attention if irritation persists.

Thermal or flash burns should be treated as medical emergencies.

SKIN CONTACT:

Dust or particulates may cause irritation due to abrasion. Some components in this product are capable of causing an allergic reaction, possibly resulting in itching and skin eruptions. Diseases of the skin, such as 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 may cause irritation of the nose, throat, and lungs. Excessive inhalation of metallic fumes from the thermite 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.

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In case of overexposure to dust or fumes, move to fresh air. 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.

SECTION 5: FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA:

Do not use water, carbon dioxide, or foam on a fire involving a thermite 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 FIRE FIGHTING PROCEDURES:

Fire fighters should wear full fire fighting turn-out gear and self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Material is not sensitive to mechanical impact or static discharge. 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:

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.

SECTION 6: ACCIDENTAL RELEASE MEASURES

ACCIDENTAL RELEASE MEASURES:

Isolate the hazard area and deny entry to unnecessary and unprotected personnel. Using proper personal protective equipment (Section 8), sweep up the spill and place in a sealed bag or container for disposal. Wash spill area after clean-up is complete.

SECTION 7: HANDLING AND STORAGE

HANDLING:

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

STORAGE:

Store in a cool, dry, well ventilated storeroom away from incompatible materials. Store in general storage area with other items. Avoid heat and moisture. Shelf life is indefinite if stored properly.

OTHER PRECAUTIONS:

Do not use wet material for rail welding. Wet Thermit® Welding Powder that is ignited will react violently.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

No permissible exposure limits (PEL) or threshold limit values (TLV) exist for steel nor Thermit® Welding Powder. The listing below is a summary of elements used in mixture. Various grades of Thermit® Welding Powder will contain different combinations of the elements and/or trace materials. The exact percentage of alloying metals is considered a trade secret.

INGREDIENT	ACGIH TLV TWA	OSHA PEL	NIOSH
Iron Oxide	5 mg / m ³	15 mg / m ³ (total) 5 mg / m ³ (resp)	<10 mg / m ³
Aluminum	1 mg / m ³	15 mg / m ³ (total) 5 mg / m ³ (resp)	10 mg / m ³ (total) 5 mg / m ³ (resp)
Alloying Elements:			
Manganese	0.2 mg / m ³	5 mg / m ³	1 mg / m ³ (time weighted average)
Ferro Vanadium	1 mg / m ³	1 mg / m ³	1 mg / m ³
Ferro Molybdenum	ND	ND	ND

ENGINEERING CONTROLS:

When using Thermit® Welding 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 thermite reaction.

VENTILATION :

Use local exhaust ventilation, or other engineering controls, to keep airborne levels below the recommended exposure limits if Thermite reaction is initiated in an enclosed space.

RESPIRATORY PROTECTION:

Use a NIOSH/MSHA approved respirator with a dust cartridge when handling this product if exposure limits for any of the components are exceeded, or if irritation or other symptoms are experienced. Use a self-contained breathing apparatus if there is exposure to smoke from the Thermite reaction or a fire involving the Thermit® Welding Powder.

EYE PROTECTION:

Safety glasses should be used when handling the powder. When igniting Thermit® Welding Powder, 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, protect skin from high temperatures. Welding gloves, jackets, pants, bibs, or aprons should be used during the welding process.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:

Faceshields and hard hats should be used to protect users from sparks during the welding and grinding processes.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Granular mixture, silver, black, brown, red, and gray in color
ODOR:	Odorless
PHYSICAL STATE:	Solid
pH AS SUPPLIED:	Not Applicable
BOILING POINT:	Not Applicable
MELTING POINT:	> 1220°F / 660°C
FREEZING POINT:	Not Applicable
VAPOR PRESSURE (mmHg):	Not Applicable
VAPOR DENSITY (AIR = 1):	Not Applicable
SPECIFIC GRAVITY (H₂O = 1):	> 1 g/mL @ 20°C
EVAPORATION RATE:	Not Applicable
SOLUBILITY IN WATER:	Insoluble
WEIGHT PERCENT SOLIDS:	100% Solids
PERCENT VOLATILE:	Not Available
MOLECULAR WEIGHT:	Not Available
VISCOSITY:	Not Applicable
FLAMMABLE LIMITS:	Not available.
FLASH POINT:	Not applicable
AUTOIGNITION TEMPERATURE:	> 1830°F / 999°C

SECTION 10: STABILITY AND REACTIVITY

STABILITY: ☒ **STABLE** ☐ **UNSTABLE**

CONDITIONS TO AVOID (STABILITY): Does not spontaneously ignite.

INCOMPATIBILITY (MATERIAL TO AVOID): Reacts with water, acids, and caustic solutions.

HAZARDOUS DECOMPOSITION OR BY-PRODUCTS: Can produce hydrogen when exposed to water, caustic solutions or acid.

HAZARDOUS POLYMERIZATION: Does not occur.

CONDITIONS TO AVOID (POLYMERIZATION): Not applicable.

SECTION 11: TOXICOLOGICAL INFORMATION

ACUTE SYMPTOMS / SIGNS OF EXPOSURE:

EYE CONTACT:

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SKIN CONTACT:

Dust or particulates may cause irritation due to abrasion. Some components in this product are capable of causing an allergic reaction, possibly resulting in itching and skin eruptions. Diseases of the skin, such as

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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.

INHALATION:

Dust may cause irritation of the nose, throat, and lungs. 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.

CHRONIC EFFECTS: None expected.

SENSITIZATION: None expected.

TOXICITY TO ANIMALS:	Thermit® Welding Powder:	LD 50 [oral, rat]:	Not applicable
		LC 50 [rat]:	Not applicable
		LD 50 [dermal, rabbit]:	Not applicable

Thermite powder or its ingredients are not listed in the National Toxicology Program Report on Carcinogens or as a potential carcinogen by OSHA, and have not been identified to be a potential carcinogen in the International Agency for Research on Cancer Monographs.

SECTION 12: ECOLOGICAL INFORMATION

ECOTOXICITY (AQUATIC AND TERRESTRIAL): Ecological impact has not been determined.

SECTION 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.

RCRA HAZARD CLASS:

Ingredients or the product are not Listed Hazardous Wastes. The product may meet the definition of a Reactive Hazardous Waste (40 CFR 261.23).

SECTION 14: TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION

PROPER SHIPPING NAME:	THERMIT
HAZARD CLASS:	NOT APPLICABLE
ID NUMBER:	50390
PACKING GROUP:	NOT APPLICABLE
LABEL STATEMENT:	ITEM#50390 CLASS 55

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WATER TRANSPORTATION

PROPER SHIPPING NAME:	THERMIT
HAZARD CLASS:	NOT APPLICABLE
ID NUMBER:	50390
PACKING GROUP:	NOT APPLICABLE
LABEL STATEMENTS:	ITEM#50390 CLASS 55

AIR TRANSPORTATION

PROPER SHIPPING NAME:	THERMIT
HAZARD CLASS:	NOT APPLICABLE
ID NUMBER:	50390
PACKING GROUP:	NOT APPLICABLE
LABEL STATEMENTS:	ITEM#50390 CLASS 55

CANADA TDG: Not regulated.

SECTION 15: REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS

EPCRA Section 302 – Extremely Hazardous Substances:

Thermit® Welding Powder or ingredients are not listed.

CERCLA - Hazardous Substances:

Thermit® Welding Powder or ingredients are not listed.

EPCRA Section 313 – Toxic Chemicals:

CAS # 7429-90-5, Aluminum, is on the list as a fume or dust.

CAS # 7439-96-5, Manganese, is on the list.

CAA 112(r) - Regulated Chemicals for Accidental Release Prevention:

Thermit® Welding Powder or ingredients are not listed.

STATE REGULATIONS:

New Jersey Right to Know Hazardous Substance List:

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

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

CAS # 7439-96-5, Manganese, is on the list.

CAS # 12604-58-9, Ferro Vanadium, is on the list.

CAS # 14808-60-7, Silica - Quartz, is on the list.

California Proposition 65 List of Chemicals:

Crystalline silica is on the list.

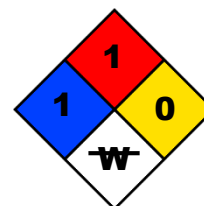
SECTION 16: OTHER INFORMATION

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.



HMIS HAZARD CLASSIFICATION

HEALTH: 1 **FLAMMABILITY:** 1 **REACTIVITY:** 0

PROTECTION: 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

PREPARATION INFORMATION: Last revised August 17, 2017. Reviewed 1/12/2021

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 particular process. Because safety standards and regulations are subject to change and because Orgo-Thermit has no continuing control over such changes; those handling, storing, or using the material should satisfy themselves that they have current information regarding the particular 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.