Material Safety Data Sheet

Martrex, Inc.

Section 1: Chemical Product and Company Information

Product name: Sulfur Prills

Supplier/ Further Information: Martrex, Inc.
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Minnetonka, Minnesota 55345-3793
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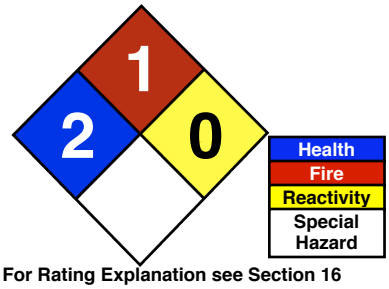
EPA Registration Number: no data
CAS#: 7704-34-9
Chemical Name: Sulfur, elemental
Synonyms: YELLOWSTONE BRAND Sugarhouse Flaked Sulfur; Flaked Sulfur; Disintegrating Sulfur Granules for Agriculture; Lump Sulfur. Brimstone, Crude Sulfur, Elemental Sulfur, Sulphur, Lump Sulfur, Crushed Sulfur
Chemical Family: Sulfur
MSDS Number: no data



For Rating Explanation see Section 16

24 Hour Emergency Phone - Chemtrec Transport: 1-800-424-9300; Medical: 1-800-441-3637

Section 2: Composition/Information on Ingredients (exceeding 1% by weight)

Component	CAS#	%	OSHA PEL	OSHA STEL	OSHA TWL
Sulfur, elemental (grades⬇)	7704-34-9	⬇	no data	no data	no data
Flaked, Sugarhouse, High Purity		99.9% minimum			
Lump or Crude		varies ca. 99%			
Disintegrating types-Ag Grade		90.0% minimum**			

OTHER LIMITS	RTECS#	ACGIH TLV	ACGIH STEL	ACGIH CEIL
See Section 15	no data	none established*	no data	no data

Component	CAS#	%	OSHA PEL	OSHA STEL	OSHA TWL
Bentonite Clay-Ag Grade Only	1302-78-9	10% maximum**	no data	no data	no data

OTHER LIMITS	RTECS#	ACGIH TLV	ACGIH STEL	ACGIH CEIL
See Section 15	no data	none established*	no data	no data

*No standards exist for elemental sulfur or bentonite exposure. [Bentonite clays may contain some free silica; **the OSHA PEL for silica is 30 mg/m³/(%Si02 + 2 total dust)]. OSHA TWA is 0.1mg/mg *(respirable).** The Nuisance Dust Recommendation should govern exposure to solid sulfur and/or sulfur-clay mixtures in the absence of other standards, in the opinion of this writer. **For Nuisance Dusts: OSHA = 15 mg/m³ (total) and 5 mg/m³ (as respirable dust); ACGIH = 10 mg/m³ (total dust) or 5 mg/m³ (as respirable dust).**

**Disintegrating Type sulfur content may be different depending on formulation; consult actual package label, invoice, or manufacturer. Disintegrating type sulfurs are intended only for agricultural use as plant nutrient and soil amendment materials. The clays are used as an aid to product disintegration in the soil. YELLOWSTONE BRAND 90% Disintegrating Sulfur for example is typically 90% (minimum Sulfur) and up to 10% clay/earth (bentonite).

24 Hour Emergency Phone - Chemtrec: 1-800-424-9300 Transportation
1-800-441-3637 Medical

Since the combustion of sulfur is not uncommon and since its combustion product in air is **SULFUR DIOXIDE**, the exposure limits for this gas are shown: **Sulfur Dioxide -OSHA=5 ppm TWA*; ACGIH TLV=2 ppm & STEL=5 ppm.** [Abbreviations Key: mg/m^3 designates milligrams per cubic meter; ppm designates parts per million (volume). ACC designates Acceptable Ceiling Concentration; TWA designates Time Weighted Average; PEL is Permissible Exposure Limit].

Section 3: Hazards Identification

Main hazards: Threshold limit value: none established for sulfur. Sulfur is NOT listed as Carcinogen or Potential Carcinogen under the National Toxicology Program of IARC or OSHA.

Potential Health Effects: Prolonged exposure to dust may cause skin dryness, skin and eye irritation, respiratory irritation, or possible dermatitis in sensitive persons. Do not take internally. Avoid breathing dust.

Primary Routes of Exposure / Entry: Inhalation (breathing), eye contact, skin contact. **Warning!** May cause central nervous system effects.

Target Organs: Central nervous system

Acute Exposure Symptoms

Inhalation: May cause respiratory tract irritation.

Eye Contact: May cause eye irritation. May cause lacrimation (tearing), blurred vision, and photophobia. May cause chemical conjunctivitis and corneal damage.

Skin Contact: May cause skin dryness and irritation or possible dermatitis in sensitive persons.

Chronic Exposure Symptoms: see section 11 Toxicological Information

Medical Conditions Aggravated By Long-Term Exposure: Medical Conditions that may be aggravated by exposure to fumes/hydrogen sulfide/sulfur oxides include respiratory disease or infections; cardiovascular diseases.

Section 4: First Aid Measures

Inhalation: (smoke, Sulfur Dioxide or H_2S): Remove victim to fresh air. Start artificial resuscitation and/or CPR if not breathing. **Call a physician**.

Eye Exposure: Flush eyes with water for 15 minutes. Irritation may be delayed several hours; usually disappears soon after exposure ceases. Unless irritation is obviously minor. **Call a physician**. Also see THERMAL BURNS below.**.**

Skin Exposure: Wash skin/hair thoroughly with soap and water after use to prevent irritation and transferring material to eyes from fingers/hair. Prolonged contact with skin causes skin dryness. [Has been used as an acne treatment for this reason] Lotions and moisturizers may be useful in prevention. Also see THERMAL BURNS below.

Ingestion: If ingested consult a physician. Sulfur is not considered highly toxic. Has been used medically in years past in “laxatives, alterative, antiseptics, antiparasitics” and is a component of animal feeds.

Thermal Burns: Flood EYES and/or SKIN with cool water at once! Unless skin burn is obviously minor/ superficial; seek medical attention. See that solidified sulfur is carefully and gently removed without tearing flesh. **If eyes are involved seek medical attention at once.**

NOTE TO THE PHYSICIAN: Treat symptomatically and supportively.

Section 5: Fire Fighting Measures

Flamibility Classification:

NFPA= (estimated) Health: 2; Flammability: 1; Instability: 0

DOT= see Section 14

Flash Point: 335+F

Auto-ignition Temperature(air): 478-511 degrees F

Lower explosion limit (LEL): Dust 35 g/m^3

NOTE: May vary considerably depending on particle size and dispersion.

Upper explosion limit (UEL): Dust 1400 g/m^3

NOTE: May vary considerably depending on particle size and dispersion.

Extinguishing Media: Use water, water fog, dirt, sand, or a carbon dioxide blanket to extinguish a fire. Seal closable tanks to smother a fire. Hi-velocity jets of water or gas should be avoided as these will tend to spread and splash burning material over a larger area. Gentle water sprays or flooding work best. Damage to product can be minimized by smothering (closing off air) or with carbon dioxide flooding.

Inappropriate Extinguishing Media: no data

Unusual Fire and Explosive Hazards: Combustion product is sulfur dioxide, an irritating toxic gas which smells like burning match heads. Dust air mixtures are highly flammable/explosive. Sulfur fires are deep blue at night, with very short flames. Fire is invisible by daylight except for smoke and heat. Burning material, however, turns a deep red-black.

Hazardous Decomposition Materials: no data

Special Procedures: Once a fire is controlled, post fire watch for at least 4 hours. Small fires are easy to miss and can linger for hours. Re-ignition may occur.

Fire-Fighting Instructions: Protect product and containers from ignition during nearby fires if possible. As a precaution, keep exterior of tanks and bins cool with water spray to help prevent ignition and to help control sulfur fire if ignition occurs. If sulfur ignites: Stay upwind to avoid irritating-toxic sulfur dioxide gas. Protect skin from molten sulfur burns. Indoors, especially, wear self-contained breathing apparatus of the positive pressure type. Protect the eyes. Combustion products (sulfur dioxide) will cause severe coughing/eye & throat pain/and distress. DO NOT INHALE! Avoid raising dust. Once a fire is controlled, post fire watch for at least 4 hours. Small fires are easy to miss and can linger for hours. Re-ignition may occur.

Personal Protective Equipment: Protect skin from molten sulfur burns. Indoors, especially, wear self-contained breathing apparatus of the positive pressure type. Protect the eyes. Combustion products (sulfur dioxide) will cause severe coughing/eye & throat pain/and distress.

CAUTION: DO NOT INHALE! Avoid raising dust.

Section 6: Accidental Release Measures

Spill and Leak Procedures: Avoid setting fire to spill material. Have fire fighting media at hand. Avoid creating dust and sparks with tools. Wear eye and face protection, as small brief fires may flare up if a spark is struck.

Small spills may be cleaned up with shovel and broom.

Large spills may be cleaned with front end loaders etc. however, avoid dragging blade on concrete, rocks as this will ignite sparks and potential dust flare-ups. Post fire watch until all danger of fire is past. Personnel should wash thoroughly all exposed skin and hair to prevent irritation from dust.

Waste Disposal: Burial, landfill. Local farmers may want to use the material as a plant nutrient or soil amendment provided the only contamination is dirt, and provided they have received competent advice from a soil chemist recommending the application of sulfur and appropriate application rates.

Environmental and Regulatory Reporting: In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. Follow local/state/national regulations.

Note: Local regulations may prescribe or limit action to be taken.

Section 7: Handling and Storage

Handling and Storage: Handle loose product with well grounded non-sparking process/storage equipment. Dry sulfur materials may generate static electricity and sparking during conveying or grinding. Avoid handling solid sulfur at high velocity in air. Inert gas blanketing is useful in preventing fires and explosions in processing and grinding equipment. Do not use near sparking equipment or open flames. When handling loose, bulk sulfur take special care to prevent steel forks, loader buckets etc. from dragging on rocks or concrete (sparks) and to prevent crushing product with equipment which will create dust. Exclude rocks, sand, loose iron, and other tramp material from entering any augers, elevator parts, or other mechanical handling systems.(Tramp material will cause sparking). Use good housekeeping practice; Do not allow large amounts of waste to accumulate. Enclosed equipment containing dust in air must be adequately explosion-vented or strong enough to withstand the pressures developed in a dust explosion. Do not store near oxidizing materials, or near hot equipment. In the presence of moisture over long periods of time, some sulfur will convert to

sulfuric acid which, of course, is corrosive to metals and attacks paper, concrete, wood products, etc. Store product in a dry place.

Repair & Maintenance Notes: Be familiar with all information on this sheet and use common sense. Have fire fighting media at hand.

Vessel Entry: Isolate vessel from process and heat input. Do not enter hot tanks. If molten sulfur has been generated in the process, be advised that sulfur may remain molten under a crust for a considerable time. Ventilate enclosed tanks with fresh air and purge of all potentially explosive air/dust mixtures before and during entry. Check air in enclosed spaces for flammability and oxygen and suspended dust before entry. If fires have occurred, check for Sulfur Dioxide. Wet down residual sulfur on walls to control dust and fire hazard while cleaning and working. Open-topped vessels may be swept clean wet or dry with non sparking brooms. Wear dust protection for eyes and breathing, long sleeved shirt/pants. If vessel is not to be re-used at once, rinse and dry thoroughly to limit corrosion.

Welding, Cutting,Grinding: Remove bulk sulfur from equipment or wet down thoroughly or blanket with inert gas to prevent ignition. Fully protect material in nearby equipment/containers from sparks or remove it. Eliminate all sources of sulfur dust suspended in air in welding/cutting/grinding area. Wet work is usually preferable. Welding/cutting combustion products will contain sulfur dioxide as well as noxious metal oxides. Do not breathe fumes. Ventilate properly or wear breathing protection suitable for both sulfur dioxide and welding fumes. Posting fire watch during and after such work for 4 hours recommended. For further information see also sections 3, 4, 5, 6, 8 (especially), 10.

REGULATORY REQUIREMENTS: See Section 8 for employee exposure controls and Section 15 for other regulatory requirements.

Section 8: Exposure Controls / Personal Protection

Ventilation Protection: The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Indoor use areas should have sufficient local exhaust to remove dust as it is released into the air. Use explosion-proof ventilation equipment.

Respiratory Protection: Respiratory protection recommended - dust masks suitable for use with irritating dust.

Eye Protection: Eye protection is recommended around dust for personal protection.

Skin and Body Protection: Work gloves and long sleeved shirts etc. help keep material off of skin of sensitive persons prone to skin irritation or dermatitis. Use of a good skin moisturizer before and after work helps to avert dry skin problems and discomfort. Be sure to select a skin care product which you are not allergic to. Remember also: fire fighting tools/media should be readily available. (water, dirt, shovels)

Hygienic Work Practices: Always observe good personal hygiene measures, such as washing exposed skin and hair thoroughly after use. Launder clothing. If eye irritation occurs, flush eyes with cool clean water. If eye or skin irritation persists, consult a physician. Practice good housekeeping.

Environmental Controls: See Sections 6, 7, 12, 13.

Section 9: Physical and Chemical Properties

Chemical Name: Sulfur, elemental

Physical State: solid

Color and Appearance: Bright yellow flakes, crystals, pastilles, prills, powders or granules. Melted sulfur changes from lemon yellow color to orange to red to black as temperature increases.

Note: Yellowstone Brand Disintegrating Sulfur is a pale greenish yellow in color rather than yellow and may have an ammonia-like and/or linseed-oil-like odor.

Odor: very slight - sweet to mercaptany. A strong “sulfuric” odor is present in liquid state.

Odor Threshold: no data

pH (in water): no data

Specific Gravity (at room temperature)**:** 2.07

Vapor Pressure (at 140°F)**:**1.15 x 10 = 4 mm Hg

Vapor Density (at boiling point)**:** 0.2278 pounds/cubic foot. >1 (air=1)

Relative Density: no data

Density (@15°C): no data

Flash Point: 335+F
Auto-ignition Temperature (air)**:** 478-511 degrees F
Lower explosion limit (LEL): Dust 35 g/m^3
Upper explosion limit (UEL): Dust 1400 g/m3
Volatiles by Volume @ 21°C: 0
Boiling Point: 832.3 degrees F at one atmosphere pressure
Softening Point: no data
Melting Point: 231 - 246 Degrees F depending on temperature history
Evaporation Rate: <<1 (ether=1)
Solubility in water: nil
Other Solubilities: no data
Viscosity: Viscosity of molten sulfur increases rapidly with temperature and then falls back off with further temperature increase.
Coefficient of Thermal Expansion: no data
Chemical Formula: S_8
Molecular Weight: 256.53

Section 10: Stability and Reactivity

Chemical Stability: Stable__X__ Unstable____ Material is stable under normal conditions.
*Elemental sulfur is stable by itself at ambient temperatures.
Conditions to Avoid: mixtures of air and sulfur dust, sparks or open flames, mixtures of sulfur and oxidizing agents (other than sulfur) in general, large accumulations of sulfur dust which could become airborne in an explosion or process disruption caused by other materials. Examples of common oxidizing agents are PERCHLORATES, NITRATES, CHLORATES, PERMANGANATES, PEROXI DES, OXYGEN, HALOGENS, etc. Good housekeeping is important to minimize fire danger.
General Information: Solid sulfur is satisfactorily compatible with common materials of construction including steel and aluminum. Molten sulfur may attack and degrade rubber and some plastics. At still higher temperatures sulfur will react with hydrocarbons evolving poisonous hydrogen sulfide gas in the absence of air. The gas is also flammable. Sulfur is both an **OXIDIZING AGENT** and a **REDUCING AGENT**. Sulfur will form sulfides with most metals, including iron, and reacts vigorously with metals in the Sodium and Magnesium groups on the periodic table. Sulfides of iron will oxidize fairly rapidly in moist air. In the presence of other readily oxidized combustibles (such as some oily materials) under certain conditions, the heat liberated may be sufficient to result in spontaneous ignition. This phenomenon has not been observed with these pure Sulfur products or Disintegrating Sulfur in contact with unprotected steel at ordinary ambient temperatures, however. Users are cautioned against allowing inadvertent mixtures of sulfur, iron, and miscellaneous oils to remain. Oxidation is accelerated by higher temperatures. Heat buildup and ignition can be prevented by keeping the sulfides wet until oxidation is complete. The literature on sulfur is extensive. Consult a chemist before compounding.
Hazardous Decomposition Products: Sulfur dioxide gas is poisonous, irritating and a choking gas. It smells like burning match heads (which also liberate Sulfur dioxide). Do not inhale! If exposed get to fresh air at once. Treat over-exposure same as for smoke inhalation.

Section 11: Toxicological Information

LD_{50}/LC_{50}: No information found relating to normal routes of occupational exposure. Irritation: eye human: 8 ppm.
Epidemiology: No information available.
Teratogenicity: No information available.
Reproductive Effects: No information available.
Neurotoxicity: No information available.
Mutagenicity: No information available.
Other Studies: No data available.

Carcinogen: Sulfur is NOT listed as Carcinogen or Potential Carcinogen under the National Toxicology Program of IARC or OSHA.

Section 12: Ecological Information

Ecotoxicity:

Environmental Fate: No information found.

Environmental Toxicity: This material is not expected to be toxic to aquatic life. The LC_{50}/96-hour values for fish are over 100 mg/l.

Section 13: Disposal Considerations

Disposal recommendations Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

Waste Disposal: Burial, landfill. Local farmers may want to use the material as a plant nutrient or soil amendment provided the only contamination is dirt, and provided they have received competent advice from a soil chemist recommending the application of sulfur and appropriate application rates.

RCRA P-Series: None listed.

RCRA U-Series: None listed.

Section 14: Transport Information

DOT Shipping Name: SULFUR, 9, NA1350, PG lll. [See 49 CFR § 172.101 Hazardous Materials Table, and 49 CFR § 172.202 Description of Hazardous Material on Shipping Papers.]

DOT Hazard Class: YELLOWSTONE BRAND SULFUR (with the exception of Bulk Packaged Ground Sulfur) is **NOT considered Hazardous Material** per [49 CFR § 172.102(c)(1) Code/Special Provision 30].

DOT #: NA1350

DOT LABELS: NONE REQUIRED (with the exception of Bulk Packaged Ground Sulfur) per [49 CFR § 172.102(c)(1) Code/Special Provision 30]. CLASS 9 for Bulk Packaged Ground Sulfur.

EPA TOSCA & CAS#: 7704-34-9

DOC Schedule B No: 2503.10.0000 Ck Dgt 6

Section 15: Regulatory Information

US FEDERAL

TSCA: CAS# 7704-34-9 is listed on the TSCA inventory.

Health & Safety Reporting List: None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules: None of the chemicals in this product are under a Chemical Test Rule.

Section 12b: None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule: None of the chemicals in this material have a SNUR under TSCA.

SARA

Section 302 (RQ): None of the chemicals in this material have an RQ.

Section 302 (TPQ): None of the chemicals in this product have a TPQ.

SARA Codes: CAS # 7704-34-9: acute, chronic, flammable.

Section 313: No chemicals are reportable under Section 313.

Clean Air Act: This material does not contain any hazardous air pollutants. This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.

Clean Water Act: None of the chemicals in this product are listed as Hazardous Substances under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA: None of the chemicals in this product are considered highly hazardous by OSHA.

STATE: CAS# 7704-34-9 can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Massachusetts. California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: XI

Risk Phrases: R 36 Irritating to eyes.

Safety Phrases:

WGK (Water Danger/Protection): CAS# 7704-34-9: 1

Canada

DSL List: CAS# 7704-34-9 is listed on Canada's DSL List. CAS# 7704-34-9 is listed on Canada's DSL List.

WHMIS: This product has a WHMIS classification of B4, D2B.

Canada's Ingredient Disclosure List: CAS# 7704-34-9 is not listed on Canada's Ingredient Disclosure List.

Exposure Limits

Section 16: Other Information

ACGIH - American Conference of Governmental Industrial Hygienists
ANSI - American National Standards Institute
CAS - Chemical Abstracts Service
CERCLA - Comprehensive Environmental Response, Compensation & Liability Act of 1980
CFR - Code of Federal Regulations
CHEMTREC - Chemical Transportation Emergency Center
DOT - U.S. Department of Transportation
DSL - Canadian Domestic Substance List
EHS - Extremely Hazardous Substance
EPA - U.S. Environmental Protection Agency
HMIS - Hazardous Material Identification System
IARC - International Agency for Research on Cancer
LEL/UEL - Lower and Upper Explosive Limit
mg/m³ - Milligrams per cubic meter
MSDS - Material Safety Data Sheet
NAERG - North American Emergency Response Guidebook
NIOSH - National Institute of Occupational Safety and Health
NFPA - National Fire Protection Association
NTP - National Toxicology Program
OSHA - Occupational Safety and Health Administration
PEL - Permissible Exposure Limit (set by OSHA)
PPE - Personal Protective Equipment
RCRA - Resource Conservation and Recovery Act of 1976
SARA - Superfund Amendments and Reauthorization Act
TDG (Canadian): Transport of Dangerous Goods Regulations

NFPA Rating Explanation Guide

Rating Number	Health Hazard	Flamibility Hazard	Instability Hazard
4	Can be lethal	Will vaporize and readily burn at normal temperatures	May explode at normal temperatures and pressures
3	Can cause serious or permanent injury	Can be ignited under almost all ambient temperatures	May explode at high temperature or shock
2	Can cause temporary incapacitation or residual injury	Must be heated or high ambient temperature to burn	Violent chemical change at high temperatures or pressures
1	Can cause significant irritation	Must be preheated before ignition can occur	Normally stable. High temperatures make unstable
0	No Hazard	Will not burn	Stable

Rating Symbol	Special Hazard
ALK	Alkaline
ACID	Acidic
BIO	BioHazard
COR	Strong Corrosive
CRYO	Cryogenic
OXY	Oxidizer
☢	Radioactive
W	Reacts violently or explosively with water
W OX	Reacts violently or explosively with water or oxidizer

TLV - Threshold Limit Value (set by ACGIH)
TWA - 8-hour Time Weighted Average
TSCA - US Toxic Substance Control Act
WHMIS - Workplace Hazardous Material Information System

MSDS Issue Date: n/a
Revised Date: 9-29-2010
Supersedes: n/a

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