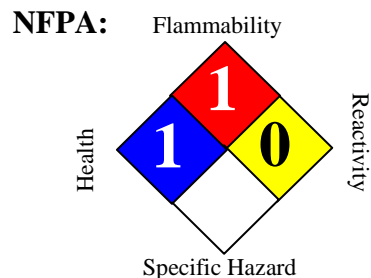


Safety Data Sheet

Sulfur, Prill



SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Sulfur, Prill			
Synonyms	:	Sulfur Block, Brimstone, Sulphur, 888100004458			
SDS Number	:	888100004458	Version	:	1.13
Product Use Description	:	Refining byproduct			
Company	:	For: Tesoro Refining & Marketing Co. 19100 Ridgewood Parkway, San Antonio, TX 78259			
Tesoro Call Center	:	(877) 783-7676	Chemtrec (Emergency Contact)	:	(800) 424-9300

SECTION 2. HAZARDS IDENTIFICATION

Classifications	Flammable Solid – Category 2
Pictograms	
Signal Word	Warning
Hazard Statements	Dry, crushed or powdered sulfur can be ignited by friction, static electricity, heat, sparks or flames. Airborne sulfur dust can form explosive dust mixture with air. Excessive exposure to dust may cause skin, eye or respiratory tract irritation. Toxic hydrogen sulfide (H ₂ S) and sulfur dioxide (SO ₂) gases may be released by sulfur. Concentrations of H ₂ S and SO ₂ may accumulate in or near sulfur storage or handling areas. Over-exposure to these gases can cause respiratory collapse, coma and death. Burning sulfur releases toxic oxides of sulfur such as SO ₂ .
Precautionary Statements	
Prevention	Keep away from flames and hot surfaces. No smoking. Avoid accumulations of sulfur dust. Do not breathe dust. Use only outdoors or in a well-ventilated area.
Response	In case of fire: Use dry chemical, CO ₂ , water spray or fire fighting foam to

extinguish.

If sulfur dust on skin (or hair): Rinse skin with water or shower. Remove and wash contaminated clothing. Seek medical attention if irritation persists.

If in eye: Rinse cautiously with water to remove dust. Seek medical attention if irritation persists.

For dust inhalation: Remove person to fresh air and keep comfortable for breathing. Get medical attention if irritation persists.

Storage

Avoid releasing H₂S and SO₂ into areas where respiratory exposure might occur. Avoid generating heavy concentrations of airborne, finely-ground sulfur dust. Avoid accumulations of sulfur dust on surfaces of equipment or buildings.

Disposal

Dispose of contents/containers to approved disposal site in accordance with local, regional, or national regulations.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Weight %
Sulfur	7704-34-9	100%
Hydrogen Sulfide	7783-06-4	0 - 1%

SECTION 4. FIRST AID MEASURES

Inhalation	: Move to fresh air. If symptoms persist, seek medical attention.
Skin contact	: Take off contaminated clothing and shoes immediately. Wash off with soap and water. Wash contaminated clothing before re-use. If symptoms persist, seek medical attention.
Eye contact	: Remove contact lenses. Rinse thoroughly with plenty of water for at least 15 minutes and seek medical attention.
Ingestion	: Do NOT induce vomiting. Drink 1 or 2 glasses of water. Seek medical attention if symptoms persist.
Notes to physician	: Symptoms: Ingestion may provoke the following symptoms:, Vomiting, Diarrhea, Pain, Gastrointestinal discomfort

SECTION 5. FIRE-FIGHTING MEASURES

Specific hazards during fire fighting	: Exposure to decomposition products may be a hazard to health. Toxic oxides of sulfur are generated from burning sulfur.
Special protective equipment for fire-fighters	: Firefighters should wear self-contained breathing apparatus and full protective clothing as need for protection from heat and airborne combustion products.
Further information	: Standard procedure for chemical fires.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Environmental precautions	: Local authorities should be advised if significant spillages cannot be contained. Discharge into the environment must be avoided.
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Methods for cleaning up : Contain and collect spillage with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations. Carefully vacuum, shovel, scoop or sweep up into a waste container for reclamation or disposal. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

CERCLA Hazardous substances and corresponding RQs :

Hydrogen Sulfide 7783-06-4 100 lbs

SECTION 7. HANDLING AND STORAGE

Precautions for safe handling : Handle and open containers with care. Protect from moisture.

: Minimize dust generation and accumulation. Dust may form explosive mixture with air. Keep away from heat and sources of ignition. No smoking near areas where material is stored or used. Electrical installations and equipment in hazardous locations should be installed according to articles 501 and 502 of the National Electric Code. Reference also NFPA 655 Standard for the Prevention of Sulfur Fires and Explosions.

Dust explosion class : Keep ignition sources away from sulfur dust. Severe hazard if high concentrations of airborne dust are generated.

Conditions for safe storage, including incompatibilities : Keep container tightly closed in a dry and well-ventilated place. Prevent unauthorized access.

: Keep away from food, drink and animal feed. Avoid dispersal of dust in the air such as cleaning dusty surfaces with compressed air.

: Stable under recommended storage conditions.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines

List	Components	CAS-No.	Type:	Value
OSHA	Sulfur	7704-34-9	TWA	15 mg/m ³
	Hydrogen Sulfide	7783-06-4	STEL	20 ppm
ACGIH	Hydrogen Sulfide	7783-06-4	TWA	1 ppm
		7783-06-4	STEL	5 ppm

Engineering measures : Provide adequate ventilation. Handle only in a place equipped with local exhaust (or other appropriate exhaust). Dust control equipment such as local exhaust ventilation or material transport systems handling sulfur should contain explosion relief vents or explosion suppression systems.

Eye protection : Safety glasses. Indirect vented, dust-tight goggles are recommended if dust is generated when handling this product. Ensure that eyewash stations and safety showers are close to the workstation location.

Hand protection : Impervious gloves such as neoprene gloves. If product is hot, thermally protective gloves are recommended. Consult manufacturer specifications for further information.

Skin and body protection	: Flame resistant clothing such as Nomex ® is recommended in areas where material is stored or handled.
Respiratory protection	: Where dust or sulfur dioxide are generated and cannot be controlled to within acceptable levels, use appropriate NIOSH-approved respiratory protection equipment (a combination of a 42CFR84 Class N, R or P-95 particulate filter and an acid gas cartridge). Where hydrogen sulfide is present or possibly present in confined spaces at hazardous levels a NIOSH-approved supplied air respirator or self-contained breathing apparatus (SCBA) is necessary.
Hygiene measures	: Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes and clothing. Promptly remove contaminated clothing and launder before reuse. Wash hands before breaks and at the end of workday.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	: Yellow solid
Odor	No odor from sulfur
Odor threshold	May release H ₂ S with 10 ppb or less odor threshold
pH	No data available
Melting point / freezing point	107°C
Initial boiling point	445°C
Flash point	167 °C (333 °F)
Evaporation rate	No data available
Flammability (solid/gas)	Solid
Upper flammable limit	1400 g/m ³
Lower flammable limit	15 g/m ³ for airborne dust
Vapor pressure	1.3 kPa at 118.9 °C (246.0 °F)
Vapor density (air = 1)	No data available
Relative density (water = 1)	2.1 g/cm ³
Solubility (in water)	Insoluble
Partition coefficient (n-octanol/water)	No data available
Auto Ignition temperature	235 °C (455 °F)
Kinematic viscosity	No data available
Kst	151 bar-m/s for dust from solid sulfur
MIE	< 1mJ

SECTION 10. STABILITY AND REACTIVITY

Reactivity	Sulfur is incompatible with a number of chemical materials including, but not
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limited to, chlorates, nitrates, other oxidizers, carbides, halogens, potassium, phosphorus, and heavy metals. This incompatibility may result in fire, excessive heat generation, uncontrolled reaction, release of toxic products and/or explosion. A comprehensive list of incompatible materials may be found in the latest edition of Sax's "Dangerous Properties of Industrial Materials" and the NFPA "Hazardous Materials Guide".

Chemical stability

Stable under normal conditions

Possibility of hazardous reactions

Corrosive in contact with metals such as mild steel. Avoid moisture. H₂S is a flammable gas and may present an explosion hazard in a confined space. Under certain conditions, H₂S can react to form pyrophoric iron compounds in enclosed spaces such as sulfur pits.

Conditions to avoid

High temperatures, incompatible materials, ignition sources, dust generation, excess heat. Fire can cause containers to burst/explode.

Hazardous decomposition products

Sulfur burns to sulfur dioxide. Sulfur reactions with hydrocarbons and other organic materials may produce hydrogen sulfide and carbon disulfide. Other possibly toxic reaction or decomposition products are highly dependent on the incompatible material.

SECTION 11. TOXICOLOGICAL INFORMATION**Skin contact**

Sulfur dust may cause slight skin irritation.

Eye contact

Sulfur dust can be irritating.

Ingestion

Ingestion causes irritation of upper respiratory system and gastrointestinal disturbance.

Inhalation

Inhalation of dust may cause slight throat and lung irritation.

Further information

Sulfur is not considered a human carcinogen by the Occupational Safety and Health Administration (OSHA), the National Toxicology Program (NTP), the American Conference of Governmental Industrial Hygienists (ACGIH), the International Agency for Research on Cancer (IARC), or the European Union (EU). Inhalation of low levels of vapors containing hydrogen sulfide or sulfur dioxide can produce respiratory tract irritation characterized by sneezing, coughing, sore throat and chest pain. At increasing concentrations, exposure to hydrogen sulfide and sulfur dioxide can result in pulmonary edema, dizziness, nausea, respiratory paralysis, unconsciousness and death. Asthmatics may be more susceptible to sulfur dioxide exposures.

Component:

Sulfur	7704-34-9	<p><u>Acute oral toxicity:</u> Dose: Rat-oral LD50 = > 5000 mg/kg</p> <p><u>Acute dermal toxicity:</u> LD50 rabbit Dose: 2,001 mg/kg</p> <p><u>Acute inhalation toxicity:</u> LC50 rat Dose: 9.24 mg/l Exposure time: 4 h</p> <p><u>Eye irritation:</u> Classification: Irritating to eyes. Result: Mild eye irritation</p>
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Carcinogenicity

NTP	No component of this product which is present at levels greater than or equal to 0.1 % is identified as a known or anticipated carcinogen by NTP.
IARC	No component of this product which is present at levels greater than or equal to 0.1 % is identified as probable, possible or confirmed human carcinogen by IARC.
OSHA	No component of this product which is present at levels greater than or equal to 0.1 % is identified as a carcinogen or potential carcinogen by OSHA.
CA Prop 65	This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.

SECTION 12. ECOLOGICAL INFORMATION

Additional ecological information : Keep out of sewers, drainage areas, and waterways. Report spills and releases, as applicable, under Federal and State regulations.

Component:

Sulfur	7704-34-9	<p><u>Acute and prolonged toxicity for aquatic invertebrates:</u> ECO Species: Daphnia magna (Water flea) Dose: > 10,000 mg/l Exposure time: 24 h</p>
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SECTION 13. DISPOSAL CONSIDERATIONS

Disposal : Consult federal, state and local waste regulations to determine appropriate waste characterization of material and allowable disposal methods. Refer to "40 CFR Protection of Environment Parts 260 - 299" for complete waste disposal regulations for corrosive materials.

SECTION 14. TRANSPORT INFORMATION

CFR	Proper shipping name	: Sulfur
	UN-No.	: 1350
	Class	: 4.1

Packing group : III

TDG

Proper shipping name : Sulfur
 UN-No. : UN1350
 Class : 4.1
 Packing group : III

IATA Cargo Transport

UN UN-No. : UN1350
 Description of the goods : SULFUR
 Class : 4.1
 Packaging group : III
 ICAO-Labels : 4.1
 Packing instruction (cargo aircraft) : 449
 Packing instruction (cargo aircraft) : Y443

IATA Passenger Transport

UN UN-No. : UN1350
 Description of the goods : SULFUR
 Class : 4.1
 Packaging group : III
 ICAO-Labels : 4.1
 Packing instruction (passenger aircraft) : 446
 Packing instruction (passenger aircraft) : Y443

IMDG-Code

UN-No. : UN 1350
 Description of the goods : Sulfur
 Class : 4.1
 Packaging group : III
 IMDG-Labels : 4.1
 EmS Number : F-A S-G
 Marine pollutant : No

SECTION 15. REGULATORY INFORMATION

TSCA Status : On TSCA Inventory
 DSL Status : All components of this product are on the Canadian DSL list.
 SARA 311/312 Hazards : Acute Health Hazard
 Chronic Health Hazard
 Fire Hazard

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIROMENT)

The CERCLA definition of hazardous substances contains a "petroleum exclusion" clause which exempts crude oil. Fractions of crude oil, and products (both finished and intermediate) from the crude oil refining process and any indigenous components of such from the CERCLA Section 103 reporting requirements. However, other federal reporting requirements, including SARA Section 304, as well as

the Clean Water Act may still apply.

PENN RTK

US. Pennsylvania Worker and Community Right-to-Know Law (34 Pa. Code Chap. 301-323)

Components

CAS-No.

Sulfur

7704-34-9

MASS RTK

US. Massachusetts Commonwealth's Right-to-Know Law (Appendix A to 105 Code of Massachusetts Regulations Section 670.000)

Components

CAS-No.

Sulfur

7704-34-9

NJ RTK

US. New Jersey Worker and Community Right-to-Know Act (New Jersey Statute Annotated Section 34:5A-5)

Components

CAS-No.

Sulfur

7704-34-9

California Prop. 65

: This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.

SECTION 16. OTHER INFORMATION

Further information

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Revision Date : 10/29/2012