



SAFETY DATA SHEET

SDS ID NO.: 0111MAR019
Revision Date 11/17/2016

1. IDENTIFICATION

Product Name: Marathon Petroleum Molten Sulfur
Synonym: Molten Sulfur; Elemental Sulfur; Sulphur
Product Code: 0111MAR019
Chemical Family: Non-metallic element
Recommended Use: Feedstock.
Restrictions on Use: All others.

Manufacturer, Importer, or Responsible Party Name and Address:
MARATHON PETROLEUM COMPANY LP
539 South Main Street
Findlay, OH 45840

SDS information: 1-419-421-3070
Emergency Telephone: 1-877-627-5463

2. HAZARD IDENTIFICATION

Classification

OSHA Regulatory Status

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin corrosion/irritation	Category 2
Acute aquatic toxicity	Category 3

Hazards Not Otherwise Classified (HNOC)

May release hydrogen sulfide gas
Hot liquid may cause thermal burns

Label elements

EMERGENCY OVERVIEW

Warning

May release highly toxic hydrogen sulfide gas that quickly fatigues the sense of smell
Contact with product at elevated temperatures can result in thermal burns
Causes skin irritation
Harmful to aquatic life

**Appearance** Yellow Liquid**Physical State** Liquid**Odor** Rotten egg like**Precautionary Statements - Prevention**

Wear protective gloves/protective clothing/eye protection/face protection
 Wash hands and any possibly exposed skin thoroughly after handling
 Avoid release to the environment

Precautionary Statements - Response

For HOT material in eyes: Rinse with cool water for several minutes. Remove contacts if present and easy to do. Continue rinsing. Get immediate medical attention.
 IF ON SKIN: Gently wash with plenty of soap and water
 If skin irritation occurs: Get medical attention
 Take off contaminated clothing and wash before reuse
 For HOT material on skin: Take off immediately all contaminated clothing. Rinse skin with cool water/shower. Get immediate medical attention.

Precautionary Statements - Storage

Not applicable.

Precautionary Statements - Disposal

Dispose of contents/container at an approved waste disposal plant

3. COMPOSITION/INFORMATION ON INGREDIENTS

Molten Sulfur is extracted from various petroleum refining processes. It contains small but significant amounts of hydrogen sulfide. The Molten Sulfur is handled and shipped as a hot liquid material.

Composition Information:

Name	CAS Number	% Concentration
Sulfur, Elemental	7704-34-9	100
Hydrogen sulfide	7783-06-4	0.01-0.06

All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

4. FIRST AID MEASURES

First Aid Measures**General Advice:**

In case of accident or if you feel unwell, seek medical advice immediately (show directions for use or safety data sheet if possible).

Inhalation:

Remove to fresh air. If not breathing, institute rescue breathing. If breathing is difficult, ensure airway is clear, give oxygen and continue to monitor. If heart has stopped, immediately begin cardiopulmonary resuscitation (CPR). Keep affected person warm and at rest. If symptoms occur get medical attention.

Skin Contact:

Immediately wash exposed skin with plenty of soap and water while removing contaminated clothing and shoes. Get medical attention if irritation persists. Place contaminated clothing in closed container until cleaned or discarded. If clothing is to be laundered, inform the person performing the operation of contaminant's hazardous properties.

For contact with hot material, immerse or flush skin with large amounts of the coldest water

possible. Cover with clean cotton sheeting or gauze. Remove clothing if not sticking to skin. DO NOT try to remove solidified material from the skin as the damaged flesh can be easily torn. DO NOT try to dissolve with solvents or thinners. GET IMMEDIATE MEDICAL ATTENTION.

Eye Contact:

Flush immediately with large amounts of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Gently remove contacts while flushing. Get medical attention if irritation persists.

For contact with hot material, flush eyes immediately with large amounts water for at least 15 minutes. GET IMMEDIATE MEDICAL ATTENTION.

Ingestion:

Rinse mouth out with water. If spontaneous vomiting occurs, keep head below hips, or if patient is lying down, turn body and head to side to prevent aspiration and monitor for breathing difficulty. Never give anything by mouth to an unconscious person. Keep affected person warm and at rest. If symptoms develop, seek medical attention.

Most important signs and symptoms, both short-term and delayed with overexposure**Adverse Effects:**

Irritating to the skin and mucous membranes. Symptoms may include redness, itching, and inflammation. Contact with hot product may cause burns. Hydrogen sulfide can cause respiratory paralysis and death, depending on the concentration and duration of exposure. Do not rely on ability to smell vapors, since loss of smell rapidly occurs. Effects of overexposure include irritation of the nose and throat, nausea, vomiting, diarrhea, abdominal pain and signs of nervous system depression (e.g. headache, drowsiness, dizziness, loss of coordination and fatigue), irregular heartbeats, pulmonary edema, weakness and convulsions.

Indication of any immediate medical attention and special treatment needed**Notes To Physician:**

INHALATION: Inhalation exposure can produce toxic effects. Treat intoxications as hydrogen sulfide exposures. At high concentrations hydrogen sulfide may produce pulmonary edema, respiratory depression, and/or respiratory paralysis. The first priority in treatment should be the establishment of adequate ventilation and the administration of 100% oxygen. Monitor for respiratory distress. If cough or difficulty in breathing develops, evaluate for upper respiratory tract inflammation, bronchitis, and pneumonitis.

SKIN & EYE CONTACT: In case of exposure to hot material, treat for thermal burns.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

For small fires, Class B fire extinguishing media such as CO₂ or dry chemical can be used. For large fires use water spray or fog. Firefighting should be attempted only by those who are adequately trained and equipped with proper protective equipment.

Unsuitable extinguishing media

Do not use a solid water stream as it may scatter and spread fire.

Specific hazards arising from the chemical

This product is not a combustible material per the OSHA Hazard Communication Standard, but will ignite and burn at temperatures exceeding the flash point.

Hazardous combustion products

Smoke, carbon monoxide, and other products of incomplete combustion.

Explosion data

Sensitivity to Mechanical Impact No.

Sensitivity to Static Discharge No.

Special protective equipment and precautions for firefighters

Firefighters should wear full protective clothing and positive-pressure self-contained breathing apparatus (SCBA) with a full face-piece, as appropriate. Avoid using straight water streams. Water spray and foam (AFFF/ATC) must be applied carefully to

avoid frothing and from as far a distance as possible. Avoid excessive water spray application. Keep run-off water out of sewers and water sources.

Additional firefighting tactics

Not applicable.

NFPA

Health 2

Flammability 1

Instability 0

Special Hazard -

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Hot material causes thermal burns. Runoff may be acidic.
Protective equipment:	Use personal protection measures as recommended in Section 8.
Emergency procedures:	Advise authorities and National Response Center (800-424-8802) if the product has entered a water course or sewer. Notify local health and pollution control agencies, if appropriate.
Environmental precautions:	Contain any runoff from precipitation.
Methods and materials for containment:	Contain liquid with sand or soil.
Methods and materials for cleaning up:	Contain molten material by diking or impounding. After cooling, shovel or sweep up cold product and collect into suitable containers for disposal. Recover and return free product to proper containers.

7. HANDLING AND STORAGE

Safe Handling Precautions:	Avoid contact with skin, eyes and clothing. Avoid breathing vapors or mists. Use only with adequate ventilation. Use personal protection measures as recommended in Section 8. Exercise good personal hygiene including removal of soiled clothing and prompt washing with soap and water. Refer to applicable EPA, OSHA, NFPA and consistent state and local requirements. Harmful concentrations of hydrogen sulfide (H ₂ S) gas can accumulate in excavations and low-lying areas as well as the vapor space of storage and bulk transport compartments. Stay upwind and vent open hatches before unloading. Sulfur containing products may cause polysulfide deposits (iron sulfide) to form inside iron storage tanks. These pyrophoric deposits, upon exposure to air, can ignite spontaneously.
Storage Conditions:	Store in properly closed containers that are appropriately labeled and in a cool, well-ventilated area.
Incompatible Materials	Strong oxidizing agents.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Name	ACGIH TLV	OSHA PELs:	OSHA - Vacated PELs	NIOSH IDLH
Sulfur, Elemental 7704-34-9	-	-	-	-
Hydrogen sulfide 7783-06-4	1 ppm TWA 5 ppm STEL	Ceiling: 20 ppm Peak: 50 ppm	10 ppm TWA 14 mg/m ³ TWA 15 ppm STEL 21 mg/m ³ STEL	100 ppm

Notes: The manufacturer has voluntarily elected to provide exposure limits contained in OSHA's 1989 air contaminants standard in its SDSs, even though certain of those exposure limits were vacated in 1992.

Engineering measures:	Ensure adequate ventilation, especially in confined areas. Local or general exhaust required in an enclosed area or when there is inadequate ventilation.
<u>Personal protective equipment</u>	
Eye protection:	Wear goggles and faceshield when handling hot material.
Skin and body protection:	Insulated gloves to prevent burns to molten product. Rubber gloves for contact with dust.
Respiratory protection:	Use a NIOSH approved organic vapor chemical cartridge or supplied air respirators when there is the potential for airborne exposures to exceed permissible exposure limits or if excessive vapors are generated. Self-contained breathing apparatus should be used for fire fighting.
Hygiene measures:	Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes and clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical State	Liquid
Appearance	Yellow Liquid
Color	Pale yellow
Odor	Rotten egg like
Odor Threshold	No data available.

<u>Property</u>	<u>Values (Method)</u>
Melting Point / Freezing Point	115 °C / 239 °F
Initial Boiling Point / Boiling Range	444 °C / 832 °F
Flash Point	207 °C / 405 °F
Evaporation Rate	No data available.
Flammability (solid, gas)	Not applicable.
Flammability Limit in Air (%):	
Upper Flammability Limit:	46 (Hydrogen sulfide)
Lower Flammability Limit:	3.3 (Hydrogen sulfide)
Explosion limits:	No data available.
Vapor Pressure	10 Pa @ 135°C
Vapor Density	1.1 (Air = 1)
Specific Gravity / Relative Density	2.07 @ 70°F
Water Solubility	No data available.
Solubility in other solvents	No data available.
Partition Coefficient	No data available.
Decomposition temperature	No data available.
pH:	Not applicable.
Autoignition Temperature	248-266 °C / 478-511 °F
Kinematic Viscosity	No data available.
Dynamic Viscosity	No data available.
Explosive Properties	No data available.
VOC Content (%)	No data available.
Density	1.819 g/cm ³ @ 115°C (15.18 lb/gal @ 239°F)
Bulk Density	Not applicable.

10. STABILITY AND REACTIVITY

<u>Reactivity</u>	The product is non-reactive under normal conditions.
<u>Chemical stability</u>	The material is stable at 70°F (21°C), 760 mmHg pressure.
<u>Possibility of hazardous reactions</u>	None under normal processing.
<u>Hazardous polymerization</u>	Will not occur.

<u>Conditions to avoid</u>	Excessive heat, sources of ignition, open flame.
<u>Incompatible Materials</u>	Strong oxidizing agents.
<u>Hazardous decomposition products</u>	None known under normal conditions of use.

11. TOXICOLOGICAL INFORMATION

Potential short-term adverse effects from overexposures

Inhalation	May release highly toxic hydrogen sulfide gas that quickly fatigues the sense of smell. Concentrations of >1000 ppm will cause immediate unconsciousness and death through respiratory paralysis.
Eye contact	Contact with hot material may cause thermal burns.
Skin contact	Irritating to skin. Contact with hot material may cause thermal burns.
Ingestion	Swallowing hot material may cause burns to the mouth, throat, and stomach.

Acute toxicological data

Name	Oral LD50	Dermal LD50	Inhalation LC50
Sulfur, Elemental 7704-34-9	> 3000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 9.23 mg/L (Rat) 4 h
Hydrogen sulfide 7783-06-4	-	-	444 ppm (Rat) 4 h

Delayed and immediate effects as well as chronic effects from short and long-term exposure

SULFUR: Prolonged or repeated exposure to sulfur dust can cause allergic sensitization and reduced pulmonary function. Permanent eye damage (corneal opacities and cataract-like lesions) have been associated with long-term and high-level exposure to sulfur.

HYDROGEN SULFIDE: Hydrogen sulfide gas has an unpleasant odor that diminishes with increased exposure. Eye irritation may occur at levels above 4 ppm. Olfactory fatigue occurs rapidly at levels of 50 ppm or higher. Odor is not a reliable warning property. Respiratory effects include irritation with possible pulmonary edema at levels above 50 ppm. At 500 ppm immediate loss of consciousness and death can occur. NIOSH has determined that 100 ppm hydrogen sulfide is immediately dangerous to life and health (IDLH).

Adverse effects related to the physical, chemical and toxicological characteristics

Signs and Symptoms	Irritating to the skin and mucous membranes. Symptoms may include redness, itching, and inflammation. Contact with hot product may cause burns. Hydrogen sulfide can cause respiratory paralysis and death, depending on the concentration and duration of exposure. Do not rely on ability to smell vapors, since loss of smell rapidly occurs. Effects of overexposure include irritation of the nose and throat, nausea, vomiting, diarrhea, abdominal pain and signs of nervous system depression (e.g. headache, drowsiness, dizziness, loss of coordination and fatigue), irregular heartbeats, pulmonary edema, weakness and convulsions.
Sensitization	Not expected to be a skin or respiratory sensitizer.
Mutagenic effects	None known.
Carcinogenicity	None known. Cancer designations are listed in the table below

Name	ACGIH (Class)	IARC (Class)	NTP	OSHA
Sulfur, Elemental 7704-34-9	Not Listed	Not Listed	Not Listed	Not Listed
Hydrogen sulfide 7783-06-4	Not Listed	Not Listed	Not Listed	Not Listed

Reproductive toxicity	None known.
Specific Target Organ Toxicity (STOT) - single exposure	Not classified.
Specific Target Organ Toxicity (STOT) - repeated exposure	Not classified.
Aspiration hazard	No data available.

12. ECOLOGICAL INFORMATION

Ecotoxicity This product is not expected to be harmful to aquatic organisms.

Name	Algae/aquatic plants	Fish	Toxicity to Microorganisms	Crustacea
Sulfur, Elemental 7704-34-9	-	96-hr LC50 >10,000 mg/L Western mosquitofish 96-hr LC50 = 866 mg/L Zebrafish	-	-
Hydrogen sulfide 7783-06-4	-	96-hr LC50 = 0.016 mg/l Fathead minnow 96-hr LC50 = 0.013 mg/l Rainbow trout	-	-

Persistence and degradability	No information available.
Bioaccumulation	Not expected to bioaccumulate in aquatic organisms.
Mobility in soil	Not classified in terms of mobility in air, soil and water.
Other adverse effects	No information available.

13. DISPOSAL CONSIDERATIONS

Description of Waste Residues

Allow molten sulfur to cool and solidify prior to disposal.

Safe Handling of Wastes

Handle in accordance with applicable local, state, and federal regulations. Use personal protection measures as required.

Disposal of Wastes / Methods of Disposal

The user is responsible for determining if any discarded material is a hazardous waste (40 CFR 262.11). Dispose of in accordance with federal, state and local regulations.

Methods of Contaminated Packaging Disposal

Empty containers should be completely drained and then discarded or recycled, if possible. Dispose of in accordance with federal, state and local regulations.

14. TRANSPORT INFORMATION

DOT (49 CFR 172.101):

UN Proper Shipping Name:

Sulfur, Molten

UN/Identification No:

NA 2448

Class:

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Packing Group: III

TDG (Canada):

UN Proper Shipping Name: Sulfur, Molten
 UN/Identification No: UN 2448
 Transport Hazard Class(es): 4.1
 Packing Group: III

15. REGULATORY INFORMATION

US Federal Regulatory Information:

US TSCA Chemical Inventory Section 8(b): This product and/or its components are listed on the TSCA Chemical Inventory.

EPA Superfund Amendment & Reauthorization Act (SARA):

SARA Section 302: This product may contain component(s) that have been listed on EPA's Extremely Hazardous Substance (EHS) List:

Name	CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs
Sulfur, Elemental	NA
Hydrogen sulfide	500

SARA Section 304: This product may contain component(s) identified either as an EHS or a CERCLA Hazardous substance which in case of a spill or release may be subject to SARA reporting requirements:

Name	Hazardous Substances RQs
Sulfur, Elemental	NA
Hydrogen sulfide	100

SARA Section 311/312: The following EPA hazard categories apply to this product:

Acute Health Hazard

SARA Section 313: This product may contain component(s), which if in exceedance of the de minimus threshold, may be subject to the reporting requirements of SARA Title III Section 313 Toxic Release Reporting (Form R).

Name	CERCLA/SARA 313 Emission reporting:
Sulfur, Elemental	None
Hydrogen sulfide	1.0 % de minimis concentration

State and Community Right-To-Know Regulations:

The following component(s) of this material are identified on the regulatory lists below:

Sulfur, Elemental

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1757
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To-Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Listed
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed

Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed
Hydrogen sulfide	
Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1017
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To-Know:	Extraordinarily hazardous
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Not Listed
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Extraordinarily hazardous
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - fourth degree
New Jersey - Environmental Hazardous Substances List:	SN 1017 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	100 lb RQ (air); 100 lb RQ (land/water)

Canada DSL/NDSL Inventory: This product and/or its components are listed either on the Domestic Substances List (DSL) or are exempt.

Canadian Regulatory Information: This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all of the information required by those regulations.

Name	Canada - WHMIS: Classifications of Substances:	Canada - WHMIS: Ingredient Disclosure:
Sulfur, Elemental	B4	1%
Hydrogen sulfide	A,B1,D1A,D2B	1%



Note: Not applicable.

16. OTHER INFORMATION

Prepared By Toxicology and Product Safety

Revision Notes

Revision Date 11/17/2016
Revised Sections The following sections (§) have been updated:
 4. FIRST AID MEASURES
 8. EXPOSURE CONTROLS/PERSONAL PROTECTION
 9. PHYSICAL AND CHEMICAL PROPERTIES
 11. TOXICOLOGICAL INFORMATION
 14. TRANSPORT INFORMATION
 15. REGULATORY INFORMATION

Disclaimer

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 is intended as guidance for safe handling, use, processing, storage, transportation, accidental release, clean-up and disposal and is not 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.