

Safety Data Sheet



Section 1: Identification

Product identifier

Product Name • **Molten Sulfur**

Synonyms • Elemental Sulfur

SDS Number/Grade • 0106NOR002

Relevant identified uses of the substance or mixture and uses advised against

Recommended use • Industrial raw material

Details of the supplier of the safety data sheet

Manufacturer • Northern Tier Energy
301 St. Paul Park Road
St. Paul Park, MN 55071
United States
www.ntenergy.com

Telephone (General) • 651-459-9771

Emergency telephone number

Chemtrec • 800-424-9300

Section 2: Hazard Identification

United States (US)

According to: OSHA 29 CFR 1910.1200 HCS

Classification of the substance or mixture

OSHA HCS 2012 • Flammable Solids 1
Specific Target Organ Toxicity Single Exposure 3: Respiratory Tract Irritation
Specific Target Organ Toxicity Repeated Exposure 1

Label elements

OSHA HCS 2012

DANGER



Hazard statements • Flammable solid
May cause respiratory irritation
Causes damage to organs through prolonged or repeated exposure.

Precautionary statements

Prevention • Keep away from heat, sparks, open flames and/or hot surfaces. - No smoking.

Ground and/or bond container and receiving equipment.
 Use explosion-proof electrical/ventilating/lighting/equipment.
 Do not breathe mist, vapours and/or spray.
 Wash thoroughly after handling.
 Do not eat, drink or smoke when using this product.
 Use only outdoors or in a well-ventilated area.
 Wear protective gloves/protective clothing/eye protection/face protection.

- Response** • In case of fire: Use appropriate media for extinction.
 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
 Call a POISON CENTER or doctor/physician if you feel unwell.
 Get medical advice/attention if you feel unwell.

- Storage/Disposal** • Store in a well-ventilated place. Keep container tightly closed.
 Store locked up.
 Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Other hazards

OSHA HCS 2012

- Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

Canada

According to: WHMIS

Classification of the substance or mixture

WHMIS

- Flammable Solids - B4
Other Toxic Effects - D2A

Label elements

WHMIS



- Flammable Solids - B4
Other Toxic Effects - D2A

Other hazards

WHMIS

- In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).

Section 3 - Composition/Information on Ingredients

Substances

Composition					
Chemical Name	Identifiers	%	LD50/LC50	Classifications According to Regulation/Directive	Comments
Sulfur	CAS:7704-34-9	100%	NDA	OSHA HCS 2012: Flam. Sol. 1; STOT SE 3: Resp. Irrit.; STOT RE 1 (Kidney, Lungs, Liver);	NDA
Hydrogen sulfide [0% TO 0.01%]	CAS:7783-06-4	0% TO 0.01%	Inhalation-Rat LC50 • 444 ppm 4 Hour(s)	OSHA HCS 2012: Exposure Limits	NDA

Mixtures

- Material does not meet the criteria of a mixture.

Section 4: First-Aid Measures

Description of first aid measures

- Inhalation**
- Move victim to fresh air. Administer oxygen if breathing is difficult. Give artificial respiration if victim is not breathing. If signs/symptoms continue, get medical attention.
- Skin**
- In case of contact with substance, immediately flush skin with running water for at least 20 minutes. Removal of solidified molten material from skin requires medical assistance. In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- Eye**
- In case of contact with substance, immediately flush eyes with running water for at least 20 minutes. Get medical attention immediately.
- Ingestion**
- Obtain medical attention immediately if ingested.

Most important symptoms and effects, both acute and delayed

- Refer to Section 11 - Toxicological Information.

Indication of any immediate medical attention and special treatment needed

- Notes to Physician**
- All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

Section 5: Fire-Fighting Measures

Extinguishing media

- Suitable Extinguishing Media**
- LARGE FIRE: Water spray, fog or regular foam.
SMALL FIRES: Dry chemical, CO₂, sand, earth, water spray or regular foam.

- Unsuitable Extinguishing Media**
- No data available

Special hazards arising from the substance or mixture

- Unusual Fire and Explosion Hazards**
- Flammable/combustible material.
May be ignited by friction, heat, sparks or flames.
May be re-ignited after fire is extinguished.
Powders, dusts, shavings, borings, turnings or cuttings may explode or burn with explosive violence.
Some may burn rapidly with flare burning effect.
Substance may be transported in a molten form at a temperature that may be above its flash point.

- Hazardous Combustion Products**
- No data available

Advice for firefighters

- Structural firefighters' protective clothing will only provide limited protection. Wear positive pressure self-contained breathing apparatus (SCBA).
FIRE INVOLVING TANKS AND CAR/TRAILER LOADS: Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
FIRE INVOLVING TANKS OR CAR/TRAILER LOADS: ALWAYS stay away from tanks engulfed in fire.
FIRE INVOLVING TANKS OR CAR/TRAILER LOADS: Cool containers with flooding quantities of water until well after fire is out.
FIRE INVOLVING TANKS OR CAR/TRAILER LOADS: For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
LARGE FIRES: Move containers from fire area if you can do it without risk.

Section 6 - Accidental Release Measures

Personal precautions, protective equipment and emergency procedures

Personal Precautions

- Ventilate enclosed areas. Do not walk through spilled material. Contact may cause burns to skin and eyes. Wear appropriate personal protective equipment, avoid direct contact.

Emergency Procedures

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions. LARGE SPILL: Consider initial downwind evacuation for at least 100 meters (330 feet) As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions. Keep out of low areas. Keep unauthorized personnel away. Stay upwind. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).

Environmental precautions

- Prevent entry into waterways, sewers, basements or confined areas.

Methods and material for containment and cleaning up

Containment/Clean-up Measures

- LARGE SPILLS: Wet down with water and dike for later disposal. SMALL DRY SPILLS: With clean shovel place material into clean, dry container and cover loosely; move containers from spill area. Contain molten material by diking or impounding. After cooling, cold product may be collected for disposal. All equipment used when handling the product must be grounded.

Section 7 - Handling and Storage

Precautions for safe handling

Handling

- Use only with adequate ventilation. Keep away from heat and ignition sources – No Smoking. Material shipped at ~300 degrees F. Heat and splash protection required. Harmful concentrations of hydrogen sulfide (H₂S) 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. Do not cut, drill, grind or weld on empty containers since they may contain explosive residues. Minimize dust generation and accumulation. Do not breathe mist, vapours and/or spray. Avoid contact with skin, eyes, and clothing. Wear appropriate personal protective equipment, avoid direct contact. Wash thoroughly with soap and water after handling and before eating, drinking, or using tobacco.

Conditions for safe storage, including any incompatibilities

Storage

- Store in a well-ventilated place. Keep container tightly closed.

Section 8 - Exposure Controls/Personal Protection

Control parameters

Exposure Limits/Guidelines				
	Result	ACGIH	NIOSH	OSHA
Hydrogen sulfide (7783-06-4)	Ceilings	Not established	10 ppm Ceiling (10 min); 15 mg/m ³ Ceiling (10 min)	20 ppm Ceiling
	STELs	5 ppm STEL	Not established	Not established
	TWAs	1 ppm TWA	Not established	Not established

Exposure controls

Engineering Measures/Controls

- Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other

engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Use explosion-proof electrical/ventilating/lighting/equipment.

Personal Protective Equipment

Respiratory

- Follow the OSHA respirator regulations found in 29 CFR 1910.134. Use a NIOSH/MSHA approved respirator if exposure limits are exceeded or symptoms are experienced.

Eye/Face

- Wear safety goggles.

Skin/Body

- Wear appropriate gloves. Wear long sleeves and/or protective coveralls.

Environmental Exposure Controls

- Follow best practice for site management and disposal of waste. Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

Key to abbreviations

ACGIH = American Conference of Governmental Industrial Hygiene

STEL = Short Term Exposure Limits are based on 15-minute exposures

NIOSH = National Institute of Occupational Safety and Health

TWA = Time-Weighted Averages are based on 8h/day, 40h/week exposures

OSHA = Occupational Safety and Health Administration

Section 9 - Physical and Chemical Properties

Information on Physical and Chemical Properties

Material Description			
Physical Form	Liquid	Appearance/Description	A amber liquid with sulfur odor.
Color	Amber	Odor	Sulfur odor.
Odor Threshold	No data available		
General Properties			
Boiling Point	832 F(444.4444 C)	Melting Point/Freezing Point	233 F(111.6667 C)
Decomposition Temperature	No data available	pH	Neutral
Specific Gravity/Relative Density	= 2.06 Water=1	Water Solubility	Negligible < 0.1 %
Viscosity	No data available		
Volatility			
Vapor Pressure	1 mmHg (torr) @ 362 F(183.3333 C)	Vapor Density	No data available
Evaporation Rate	No data available	VOC (Wt.)	0 %
VOC (Vol.)	0 %	Volatiles (Wt.)	0 %
Volatiles (Vol.)	0 %		
Flammability			
Flash Point	403 F(206.1111 C)	UEL	No data available
LEL	No data available	Autoignition	No data available
Flammability (solid, gas)	No data available		
Environmental			
Octanol/Water Partition coefficient	No data available		

Section 10: Stability and Reactivity

Reactivity

- No dangerous reaction known under conditions of normal use.

Chemical stability

- Stable under normal temperatures and pressures.

Possibility of hazardous reactions

- Hazardous polymerization will not occur.

Conditions to avoid

- Excess heat.

Incompatible materials

- Nitrates, chlorates, peroxides.

Hazardous decomposition products

- Combustion produces toxic oxides of sulfur, carbon monoxide, sulfur dioxide, hydrogen sulfide and hydrocarbons.

Section 11 - Toxicological Information

Information on toxicological effects

Components		
Sulfur (100%)	7704-34-9	Acute Toxicity: Inhalation-Mammal LC50 • 1660 mg/m ³ ; Irritation: Eye-Human • 8 ppm; Multi-dose Toxicity: Inhalation-Rat TClO • 1.76 mg/m ³ 4 Hour(s) 30 Day(s)-Intermittent; <i>Liver:</i> Hepatitis (hepatocellular necrosis), diffuse; Kidney, Ureter, and Bladder: Changes in tubules (including acute renal failure, acute tubular necrosis)

GHS Properties	Classification
Respiratory sensitization	OSHA HCS 2012 • Data lacking
Serious eye damage/Irritation	OSHA HCS 2012 • Data lacking
Acute toxicity	OSHA HCS 2012 • Acute Toxicity - Dermal - Data lacking; Acute Toxicity - Inhalation - Inconclusive data; Acute Toxicity - Oral - Data lacking
Aspiration Hazard	OSHA HCS 2012 • Not relevant
Carcinogenicity	OSHA HCS 2012 • Data lacking
Germ Cell Mutagenicity	OSHA HCS 2012 • Data lacking
Skin corrosion/Irritation	OSHA HCS 2012 • Data lacking
Skin sensitization	OSHA HCS 2012 • Data lacking
STOT-RE	OSHA HCS 2012 • Specific Target Organ Toxicity Repeated Exposure 1
STOT-SE	OSHA HCS 2012 • Specific Target Organ Toxicity Single Exposure 3: Respiratory Tract Irritation
Toxicity for Reproduction	OSHA HCS 2012 • Data lacking

Potential Health Effects

Inhalation

Acute (Immediate)

- May cause respiratory irritation. Processes such as cutting, grinding, crushing, or impact may result in generation of excessive amounts of airborne dusts in the workplace. Nuisance dust may affect the lungs but reactions are typically reversible.

Chronic (Delayed)

- No data available

Skin

Acute (Immediate)

- Contact with heated material may cause thermal burns. Exposure to dust may cause mechanical irritation.

Chronic (Delayed)

- No data available

Eye

- Acute (Immediate)**
 - Contact with heated material may cause thermal burns. Excessive concentrations of nuisance dust in the workplace may reduce visibility and may cause unpleasant deposits in eyes.
- Chronic (Delayed)**
 - No data available

Ingestion

- Acute (Immediate)**
 - Ingestion can produce damage (thermal burns) to tissues of the gastrointestinal tract. Excessive concentrations of nuisance dust in the workplace may cause mechanical irritation to mucous membranes.
- Chronic (Delayed)**
 - No data available

Other

- Chronic (Delayed)**
 - Repeated and prolonged exposure may cause damage to the lungs, liver, kidney.

Key to abbreviations

LC = Lethal Concentration

TC = Toxic Concentration

Section 12 - Ecological Information**Toxicity**

- Non-mandatory section - information about this substance not compiled for this reason.

Persistence and degradability

- Non-mandatory section - information about this substance not compiled for this reason.

Bioaccumulative potential

- Non-mandatory section - information about this substance not compiled for this reason.

Mobility in Soil

- Non-mandatory section - information about this substance not compiled for this reason.

Other adverse effects

- Non-mandatory section - information about this substance not compiled for this reason.

Section 13 - Disposal Considerations**Waste treatment methods****Product waste**

- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Packaging waste

- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Section 14 - Transport Information

	UN number	UN proper shipping name	Transport hazard class(es)	Packing group	Environmental hazards
DOT	NA2448	Sulfur, molten	9	III	NDA

TDG	UN1350	SULFUR	4.1	III	NDA
	UN2448	SULFUR, MOLTEN	4.1	III	NDA

Special precautions for user • None specified.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code • No data available

Section 15 - Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture

SARA Hazard Classifications • Acute, Chronic, Fire

Inventory				
Component	CAS	Canada DSL	Canada NDSL	TSCA
Hydrogen sulfide	7783-06-4	Yes	No	Yes
Sulfur	7704-34-9	Yes	No	Yes

Canada

Labor

Canada - WHMIS - Classifications of Substances

- Sulfur 7704-34-9 B4
- Hydrogen sulfide 7783-06-4 A, B1, D1A, D2B

Canada - WHMIS - Ingredient Disclosure List

- Sulfur 7704-34-9 Not Listed
- Hydrogen sulfide 7783-06-4 1 %

Environment

Canada - CEPA - Priority Substances List

- Sulfur 7704-34-9 Not Listed
- Hydrogen sulfide 7783-06-4 Not Listed

United States

Labor

U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals

- Sulfur 7704-34-9 Not Listed
- Hydrogen sulfide 7783-06-4 1500 lb TQ

U.S. - OSHA - Specifically Regulated Chemicals

- Sulfur 7704-34-9 Not Listed
- Hydrogen sulfide 7783-06-4 Not Listed

Environment

U.S. - CAA (Clean Air Act) - 1990 Hazardous Air Pollutants

- Sulfur 7704-34-9 Not Listed
- Hydrogen sulfide 7783-06-4 Not Listed

U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities

- Sulfur 7704-34-9 Not Listed
- Hydrogen sulfide 7783-06-4 100 lb final RQ; 45.4 kg final RQ

U.S. - CERCLA/SARA - Radionuclides and Their Reportable Quantities

• Sulfur	7704-34-9	Not Listed
• Hydrogen sulfide	7783-06-4	Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs

• Sulfur	7704-34-9	Not Listed
• Hydrogen sulfide	7783-06-4	100 lb EPCRA RQ

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs

• Sulfur	7704-34-9	Not Listed
• Hydrogen sulfide	7783-06-4	500 lb TPQ

U.S. - CERCLA/SARA - Section 313 - Emission Reporting

• Sulfur	7704-34-9	Not Listed
• Hydrogen sulfide	7783-06-4	1.0 % de minimis concentration

U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing

• Sulfur	7704-34-9	Not Listed
• Hydrogen sulfide	7783-06-4	Not Listed

United States - California**Environment****U.S. - California - Proposition 65 - Carcinogens List**

• Sulfur	7704-34-9	Not Listed
• Hydrogen sulfide	7783-06-4	Not Listed

U.S. - California - Proposition 65 - Developmental Toxicity

• Sulfur	7704-34-9	Not Listed
• Hydrogen sulfide	7783-06-4	Not Listed

U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)

• Sulfur	7704-34-9	Not Listed
• Hydrogen sulfide	7783-06-4	Not Listed

U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)

• Sulfur	7704-34-9	Not Listed
• Hydrogen sulfide	7783-06-4	Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Female

• Sulfur	7704-34-9	Not Listed
• Hydrogen sulfide	7783-06-4	Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Male

• Sulfur	7704-34-9	Not Listed
• Hydrogen sulfide	7783-06-4	Not Listed

Section 16 - Other Information

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Preparation Date • 16/November/2015

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Key to abbreviations

NDA = No Data Available
