

SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

Product Identifier

SRM Number: 2778
SRM Name: Mercury in Crude Oil
Other Means of Identification: Not applicable.

Recommended Use of This Material and Restrictions of Use

This Standard Reference Material (SRM) is intended for use in the evaluation of chemical methods of analysis for mercury in crude oil to support environmental and safety compliance measurements associated with oil refining technology development. A unit of SRM 2778 consists of five amber glass ampoules, each containing approximately 10 mL of crude oil.

Company Information

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2. HAZARDS IDENTIFICATION

Classification

Physical Hazard:	Flammable Liquid	Category 3
Health Hazard:	Skin Irritation	Category 2
	Eye Irritation	Category 2B
	Germ Cell Mutagenicity	Category 1B
	Carcinogenicity	Category 1B
	Reproductive Toxicity	Category 2
	STOT, Single Exposure	Category 3
	STOT, Repeated Exposure	Category 1
	Aspiration Hazard	Category 1

Label Elements

Symbol



Signal Word

Danger

Hazard Statement(s)

H226	Flammable liquid and vapor.
H304	May be fatal if swallowed and enters airways.
H315+H320	Causes skin and eye irritation.
H340	May cause genetic effects.
H350	May cause cancer.
H361	Suspected of damaging fertility or the unborn child.
H336	May cause drowsiness or dizziness.
H372	Causes damage to organs (liver, kidneys, and nervous system) through prolonged or repeated exposure.

Precautionary Statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat, sparks, open flames, hot surfaces. — No smoking.
P241	Use explosion-proof electrical, ventilating, and lighting equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P260	Do not breathe fumes, mist, vapors, or spray.
P264	Wash hands thoroughly after handling.
P270	Do not eat, drink, or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves, eye protection, and protective clothing.
P301+P310+P331	If swallowed: Immediately call a doctor. Do NOT induce vomiting.
P302+P361+P352	If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304+P340	If inhaled: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338	If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313	If exposed or concerned: Get medical attention.
P332+P337+P313	If skin or eye irritation occurs: Get medical attention.
P362+P364	Take off contaminated clothing and wash it before reuse.
P403+P235+P233	Store in a well-ventilated place. Keep cool. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents and container according to local regulations.

Hazards Not Otherwise Classified: None.

Ingredients(s) with Unknown Acute Toxicity: None.

3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Substance: Crude oil

Other Designations: Petroleum; petroleum crude; coal oil; crude oil; rock oil, sweet petroleum crude - MC 252.

Components are listed in compliance with OSHA's 29 CFR 1910.1200. Trace amounts of hydrogen sulfide may be generated due to the sulfur content in the crude oil. There is not a direct correlation between hydrogen sulfide generation and the total sulfur content in this material.

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Crude oil	8002-05-9	232-298-5	99 – 100
<i>Individual Component(s)</i>			
Benzene	71-43-2	200-753-7	0.1 – 1

4. FIRST AID MEASURES

Description of First Aid Measures

Inhalation: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

Skin Contact: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

Eye Contact: Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

Ingestion: DO NOT induce vomiting. If vomiting occurs, keep head lower than hips to help prevent aspiration. Get medical attention.

Most Important Symptoms/Effects, Acute and Delayed: Irritation, cough, difficulty breathing, dermatitis.

Indication of any immediate medical attention and special treatment needed, if necessary: If any of the above symptoms are present, seek immediate medical attention.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Highly flammable liquid and vapor. Vapor/air mixtures are explosive above the flash point. See Section 9, "Physical and Chemical Properties" for flammability properties. NFPA FLAMMABILITY CLASS: 1B (flammable liquid).

Extinguishing Media

Suitable: Regular dry chemical, carbon dioxide, water, or regular foam.

Unsuitable: Avoid using straight water streams in order to prevent frothing.

Specific Hazards Arising from the Chemical: Not applicable.

Special Protective Equipment and Precautions for Fire-Fighters: Move container from fire area if it can be done without personal risk. Avoid inhalation of material or combustion by-products. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

NFPA Ratings (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health = 2 Fire = 3 Reactivity = 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures: Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection". Keep out of waters supplies and sewers.

Methods and Materials for Containment and Clean up: Avoid heat, flames, sparks and other sources of ignition. Stop leak if possible without personal risk, with water spray to reduce vapors. Absorb spilled material with sand or non-combustible material and collect in appropriate container for disposal.

7. HANDLING AND STORAGE

Safe Handling Precautions: See Section 8, "Exposure Controls and Personal Protection".

Storage and Incompatible Materials: Store in a well-ventilated area. Keep separated from incompatible substances (oxidizing materials).

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits			
Components	OSHA (PEL)	ACGIH (TLV)	NIOSH (REL)
Crude Oil ^(a)	NOEL ^(b)	NOEL	TWA: 350 mg/m ³ Ceiling: 1800 mg/m ^{3(c)} IDLH: 1100 ppm ^(d)
<i>Individual components with occupational exposure limits.</i>			
Benzene	TWA: 1 ppm STEL: 5 ppm ^(c) Ceiling: 25 ppm ^(c) Action level: 0.5 ppm ^(f)	TWA: 0.5 ppm STEL: 2.5 ppm Skin ^(e)	TWA: 0.1 ppm STEL: 1 ppm IDLH: 500 ppm

^(a) The composition of these materials varies greatly. The content of benzene, other aromatics and additives should be determined individually.

^(b) NOEL: No occupational exposure limits established.

^(c) 15 minutes.

^(d) IDLH based off of 10 % LEL.

^(e) Skin – Potential significant contribution to overall exposure by the cutaneous route.

^(f) Cancer hazard, flammable, see 29 CFR 1910.1028.

Engineering Controls: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Personal Protection Measures: In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

Respiratory Protection: If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

Eye Protection: Splash resistant safety goggles and emergency eyewash are recommended.

Skin and Body Protection: Chemical resistant clothing and gloves are recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

Descriptive Properties

Molar Mass (g/mol)
Molecular Formula
Appearance (physical state, color, etc.)
Odor
Odor threshold
pH
Evaporation rate
Melting point/freezing point
Density
Specific Gravity (water=1)
Vapor Pressure
Vapor Density (air = 1)
Viscosity
Kinematic Viscosity
Solubilities
Partition coefficient (n-octanol/water)

Crude Oil

not applicable
not applicable
not available
petroleum odor
not available
not available
not available
not available
6.0–8.5 lbs/gal
not available
<12psig kPa at 20 °C
0.21
not available
not available
low PPM range in water
not available

Thermal Stability Properties

Autoignition Temperature not available
Thermal Decomposition not available
Initial boiling point and boiling range 100-1000 deg. F (110.7 °F)
Explosive Limits, LEL not available
Explosive Limits, UEL not available
Flash Point >23°C (:> 73 °F)
Flammability (solid, gas) not applicable

10. STABILITY AND REACTIVITY

Reactivity: Stable at normal temperatures and pressure.

Stability: Stable Unstable

Possible Hazardous Reactions: Not applicable.

Conditions to Avoid: Avoid heat, flames, sparks, and other ignition sources. Avoid contact with incompatible materials. Containers may rupture or explode if exposed to heat. Keep out of water supplies and sewers. Dangerous gases may accumulate in confined spaces.

Incompatible Materials: Oxidizing materials.

Hazardous Decomposition: Oxides of carbon and sulfur.

Hazardous Polymerization: Will Occur Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure: Inhalation Skin Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: Irritation, cough, difficulty breathing, dermatitis.

Potential Health Effects (Acute, Chronic, and Delayed)

Inhalation: Irritation hazard is low unless heated or misted. Vapor or mist may cause irritation, headache, drowsiness, dizziness, loss of coordination. Prolonged contact may cause irritation.

Skin Contact: May cause skin disorders, dermatitis, and rash.

Eye Contact: Irritation, conjunctivitis.

Ingestion: May cause nausea vomiting, diarrhea, other gastrointestinal disturbances, and aspiration to the lungs may cause pneumonitis.

Numerical Measures of Toxicity

Components	Acute Toxicity
Crude Oil	Rat, Oral, LD50: >4300 mg/kg Rabbit, Dermal, LD50: >2000 mg/kg
Benzene	Rat, Oral, LD50: 930 mg/kg; 1 mL/kg; 6400 mg/kg; 1800 mg/kg Rat, Inhalation, LC50: 13 050 ppm to 14 380 ppm (4 h) Rabbit, Dermal LD50: >9400 µL/kg

Skin Corrosion/Irritation: Category 2.

Crude Oil, Human, open skin: 100 %; Rabbit, skin: 500 mg (24 h) – moderate

Benzene, Rabbit skin: 20 mg (24 h) - moderate; rabbit open skin: 15 mg (24 h) – mild

Serious Eye Damage/Eye Irritation: Category 2B.

Crude Oil, Rabbit, eyes: 100 mg – mild

Benzene, Rabbit eyes: 88 mg – moderate; 2 mg (24 h) - severe

Respiratory Sensitization: No data available.

Skin Sensitization: No data available.

Germ Cell Mutagenicity: Mutagenic Category 1B

Benzene: cytogenetic analysis, human inhalation: 0.1 ppm

Carcinogenicity: Category 1B

Listed as a Carcinogen/Potential Carcinogen X Yes No

IARC: Benzene is listed by IARC as Group 1, carcinogenic to humans; crude oil is listed by IARC as Group 3, not classifiable.

NTP: Benzene is listed by NTP as known human carcinogen.

OSHA: Benzene is on the list of OSHA identified carcinogens.

Reproductive Toxicity: Category 2

Crude oil, Rat, skin, TDLo: 200 mg/kg (pregnant 1 d to 19 d), 10 g/kg (pregnant 0 to 19 d)

Benzene, Rat Inhalation, TCLo: 50 ppm (24 h, 7 to 14 days pregnant)

STOT, Single Exposure: Category 3, Central Nervous System Depressant

The individual components have shown central nervous system depressant effects.

STOT, Repeated Exposure: Category 1

Benzene may affect blood and kidney systems.

Aspiration Hazard: Category 1

Crude oil and individual component benzene are aspiration hazards.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data

Components	Aquatic Toxicity
Crude Oil	Invertebrate: 48 Hr EC50 Freshwater water flea (<i>Daphnia magna</i>): <0.26 mg/L [static]
Benzene	Fish: 96 Hr LC50 Rainbow trout (<i>Oncorhynchus mykiss</i>): 5.3 mg/L [flow-through] Algae: 72 Hr EC50 <i>Pseudokirchneriella subcapitata</i> : 29 mg/L Invertebrate: 48 Hr EC50 Freshwater water flea (<i>Daphnia magna</i>): 9–16 mg/L [static]

Persistence and Degradability: No data available.

Bioaccumulative Potential: Bioconcentration factors: benzene (3.5 to 4.4, species fish).

Mobility in Soil: No data available.

Other Adverse effects: No data available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose in accordance with all applicable federal, state, and local regulations. Subject to hazardous waste regulations US EPA 40 CFR 262:

Crude Oil Hazardous waste number D001.

Benzene Hazardous waste number U019, ignitable waste, toxic waste, regulatory level 0.5 mg/L.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: UN1267; Petroleum Crude Oil; Hazard Class 3; Packing Group III.

15. REGULATORY INFORMATION

U.S. Regulations

CERCLA Sections 102a/103 (40 CFR 302.4): Final RQ Benzene: 10 lbs (4.54 kg)

SARA Title III Section 302 (40 CFR 355.30): Not applicable

SARA Title III Section 304 (40 CFR 355.40): Not applicable

SARA Title III Section 313 (40 CFR 372.65): Benzene, 0.1 % de minimis concentration

OSHA Process Safety (29 CFR 1910.119): Not applicable

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE HEALTH: Yes

CHRONIC HEALTH: Yes

FIRE: Yes

REACTIVE: No

PRESSURE: No

State Regulations

California Proposition 65:

WARNING! This product contains chemicals (benzene) known to the state of California to cause reproductive developmental effects.

U.S. TSCA Inventory: Crude oil and benzene are listed.

TSCA 12(b), Export Notification: None listed.

Canadian Regulations: WHMIS information is not provided for this material.

16. OTHER INFORMATION

Issue Date: 27 June 2019

Sources: Vendor MSDS, *Crude Petroleum, Sweet Crude, Sour Crude*; March 2009.
ChemADVISOR, Inc., SDS *Petroleum-Crude Oil (Untreated and Mildly-Treated)*, 09 December 2015.
ChemADVISOR, Inc., SDS *Benzene*, 09 December 2015.

Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OSHA	Occupational Safety and Health Administration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	PEL	Permissible Exposure Limit
CFR	Code of Federal Regulations	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	REL	Recommended Exposure Limit
EINECS	European Inventory of Existing Commercial Chemical Substances	RQ	Reportable Quantity
EPCRA	Emergency Planning and Community Right-to-Know Act	RTECS	Registry of Toxic Effects of Chemical Substances
IARC	International Agency for Research on Cancer	SARA	Superfund Amendments and Reauthorization Act
IATA	International Air Transport Association	SCBA	Self-Contained Breathing Apparatus
IDLH	Immediately Dangerous to Life and Health	SRM	Standard Reference Material
LC50	Lethal Concentration	STEL	Short Term Exposure Limit
LD50	Median Lethal Dose or Lethal Dose, 50 %	TLV	Threshold Limit Value
LEL	Lower Explosive Limit	TPQ	Threshold Planning Quantity
MSDS	Material Safety Data Sheet	TSCA	Toxic Substances Control Act
NFPA	National Fire Protection Association	TWA	Time Weighted Average
NIOSH	National Institute for Occupational Safety and Health	UEL	Upper Explosive Limit
NIST	National Institute of Standards and Technology	WHMIS	Workplace Hazardous Materials Information System

Disclaimer: Physical and chemical data contained in this SDS are provided only for use in assessing the hazardous nature of the material. The SDS was prepared carefully, using current references; however, NIST does not certify the data in the SDS. The values for this material are given in the NIST Certificate of Analysis.

Users of this SRM should ensure that the SDS in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srmmsds@nist.gov; or via the Internet at <https://www.nist.gov/srm>.