

MATERIAL SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2300
Gaithersburg, Maryland 20899-2300

SRM Number: 2716
MSDS Number: 2716
SRM Name: Sulfur in Gasoline
(< 1 mg/kg)

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Description: A unit of Standard Reference Material (SRM) 2716 consists of five amber ampoules, each containing approximately 20 mL of gasoline.

Substance: Gasoline

Other Designations: **Iso-octane** (isobutyltrimethylmethane; 2,4,4-trimethylpentane; trimethylpentane); **n-heptane** (normal heptane; dipropyl methane; heptyl hydride; dipropylmethane).

2. HAZARDS IDENTIFICATION

NFPA Ratings (Scale 0-4): Health = 2 Fire = 3 Reactivity = 0

Major Health Hazards: Respiratory tract irritation, skin irritation, eye irritation, aspiration hazard, central nervous system depression.

Physical Hazards: Flammable liquid and vapor. Vapor may cause flash fire. Electrostatic charges may be generated by flow, agitation.

Potential Health Effects

Inhalation:

Iso-octane: Short term exposure can cause irritation, nausea, difficulty breathing, headache, drowsiness, dizziness, loss of coordination. Chronic exposure can cause irritation, nerve damage.

n-Heptane: Short term exposure can cause irritation, headache, drowsiness, dizziness, emotional disturbances, loss of coordination, suffocation, unconsciousness.

Skin Contact: Irritation.

Eye Contact: Irritation.

Ingestion:

Ingestion of iso-octane can cause irritation, nausea, vomiting, diarrhea, stomach pain, headache, drowsiness, dizziness, emotional disturbances, loss of coordination, unconsciousness, aspiration hazard. Ingestion of n-hexane can cause diarrhea, difficulty breathing, headache, drowsiness, dizziness, loss of coordination, lung congestion, aspiration hazard.

Listed as a Carcinogen/ Potential Carcinogen

In the National Toxicology Program (NTP) Report on Carcinogens
In the International Agency for Research on Cancer (IARC) Monographs
By the Occupational Safety and Health Administration (OSHA)

Yes	No
_____	<u> X </u>
_____	<u> X </u>
_____	<u> X </u>

3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Component ^(a)	CAS Registry	EC Number (EINECS)	Nominal Mass Fraction (%)
Iso-octane	540-84-1	208-759-1	91
<i>n</i> -Heptane	142-82-5	205-563-8	9

^(a) This gasoline formulation has not been tested as a whole. Hazardous components 1 % or greater; carcinogens 0.1 % or greater are listed in compliance with OSHA 29 CFR 1910.1200.

EC Classification: F (Highly Flammable); Xn (Harmful); N (Dangerous for the Environment); Xi (Irritant)

EC Risk (R No.): 11, 38, 50, R53, R45, R65, R67

EC Safety (S No.): 2, 9, 16, 29, 33, 60, 61, 62

EC Risk/Safety Phrases: See Section 15, "Regulatory Information".

4. FIRST AID MEASURES

Inhalation: Move the person to fresh air immediately. Qualified medical personnel may start CPR or give oxygen if necessary. Seek medical aid at once, and bring the container or label.

Skin Contact: Remove contaminated clothing and shoes. Flush affected skin with water for at least 15 minutes, then wash thoroughly with soap and water. If skin irritation persists, seek medical aid and bring the container or label. Wash contaminated clothing before reusing.

Eye Contact: Flush eyes with large amounts of running water for at least 15 minutes, keeping eyelids open and raising lids to remove all chemical. Seek medical aid at once, and bring the container or label.

Ingestion: Contact a poison control center or physician immediately for instructions. Aspiration Hazard. DO NOT induce vomiting. If vomiting occurs, keep head lower than hips to help prevent aspiration. Give artificial respiration if not breathing. Seek immediate medical attention and bring the container or label.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Severe fire hazard. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back. Vapor/air mixtures are explosive above flash point.

Extinguishing Media: Use extinguishing media appropriate to the surrounding fire.

Fire Fighting: Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

Flash Point (°C) ^(a): -12 (10.4°F)

Test Method: Closed Cup

Autoignition Temp. (°C): 415 (779 °F)

Flammability Limits in Air

Lower Explosive Limit (LEL): 1.1 %

Upper Explosive Limit (UEL): 6 %

^(a) These data apply to iso-octane, the main component in the mixture.

6. ACCIDENTAL RELEASE MEASURES

Occupational Release: Notify safety personnel of spills. Do not touch spilled material. Avoid heat, flames, sparks and other sources of ignition. Reduce vapors with water spray. Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for proper disposal.

Reportable Quantity: Not applicable.

Disposal: Refer to Section 13, "Disposal Considerations".

7. HANDLING AND STORAGE

Storage: Store and handle in accordance with all current regulations and standards. Protect from physical damage. Sealed ampoules should be exposed to intense sources of radiation, including ultraviolet light or sunlight. Store at temperatures between 10 °C and 30 °C.

Safe Handling Precautions: See Section 8 “Exposure Controls and Personal Protection”.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits

Iso-octane: ACGIH: 300 ppm

n-Heptane:

ACGIH (TWA): 400 ppm

OSHA (TWA): 500 ppm

NIOSH (TWA): 83 ppm

Europe (TWA): 500 ppm

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

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

Eye Protection: Wear splash resistant safety goggles with a faceshield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Personal Protection: Wear chemical resistant gloves and protective clothing to prevent contact with skin.

9. PHYSICAL AND CHEMICAL PROPERTIES

Property ^(a)	Iso-octane	<i>n</i> -Heptane
Appearance and Odor	clear liquid, gasoline odor	clear liquid, gasoline odor
Molecular Formula	C-H ₃) ₂ -C-H-C-H ₂ -C-(C-H ₃) ₃	C-H ₃ -(C-H ₂) ₅ -C-H ₃
Molar Mass (g/mol)	114.23	100.21
Vapor Density (air = 1)	3.9	3.45
Volatility	100 %	100 %
Specific Gravity (water = 1)	0.69	0.68
Boiling Point	99 °C (210.2 °F)	98 °C (204.8°F)
Melting Point	-107 °C (-160.6 °F)	-91 °C (-131.8 °F)
Water Solubility	immiscible	0.005 %
Solvent Solubility	ether, alcohol, acetone, benzene, toluene, chloroform, xylene, carbon disulfide, carbon tetrachloride, dimethylformamide, oils	ethanol, ether, chloroform, acetone

^(a) The physical and chemical data provided are for the pure components. No physical or chemical data are available for this gasoline formulation. The actual behavior of the mixture may differ from the individual components.

10. STABILITY AND REACTIVITY

Stability: Stable Unstable

Stable at normal temperatures and pressure.

Conditions to Avoid: Avoid heat, flames, sparks and other sources of ignition. Contact or storage with incompatible materials. Ampoules may rupture or shatter. Keep out of water supplies and sewers

Incompatible Materials: Oxidizing materials, reducing agents, combustible materials.

Fire/Explosion Information: See Section 5, “Fire Fighting Measures”.

Hazardous Decomposition: Thermal decomposition can produce oxides of carbon.

Hazardous Polymerization: _____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Entry: X Inhalation X Skin X Ingestion

Toxicity Data

Iso-octane:

LD₅₀ (Rat, oral): 2.5 g/kg

LC₅₀ (Rat, inhalation): 47.4 mg/L/1 h

n-Heptane:

LD₅₀ (Rat, oral): 3 g/kg

LC₅₀ (Rat, inhalation): 103 g/m³ (4 h)

Health Effects: See Section 3: "Hazards Identification" for potential health effects.

Target Organ(s):

Iso-octane: central nervous system.

n-Heptane: central nervous system.

Medical Conditions Aggravated by Exposure:

Iso-octane: Respiratory disorders, skin disorders and allergies.

n-Heptane: Respiratory disorders, skin disorders and allergies.

Additional Data: Stimulants such as epinephrine may induce ventricular fibrillation.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data

Iso-octane: No LOLI ecotoxicity data are available for this chemical.

n-Heptane: Fish Toxicity: cichlid fish (*brachidanio rerio*) LC₅₀: 375 mg/L (96 h)

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose in accordance with federal, state, and local requirements. Keep out of water supplies and sewers. Subject to disposal regulations: U.S. EPA 40 CFR 262; Hazardous Waste Number(s): D001.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: Octanes, UN1262, PG II, 308, Excepted Quantity – E2.

15. REGULATORY INFORMATION

U.S. REGULATIONS

CERCLA Sections 102a/103 (40 CFR 302.4): Regulated.

SARA Title III Section 302: Not regulated.

SARA Title III Section 304: Not regulated.

SARA Title III Section 313: Regulated.

OSHA Process Safety (29 CFR 1910.119): Not regulated.

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

ACUTE:	Yes
CHRONIC:	Yes
FIRE:	Yes
REACTIVE:	No
SUDDEN RELEASE:	No

STATE REGULATIONS

California Proposition 65: Not regulated.

CANADIAN REGULATIONS

WHMIS Information: Not provided for this material.

EUROPEAN REGULATIONS

EC Classification: F (Highly Flammable); Xn (Harmful); Xi (Irritant); N (Dangerous for the environment)

Risk Phrases (mixture):

R11	Highly flammable.
R38	Irritating to skin.
R50	Very toxic to aquatic organisms
R53	May cause long-term adverse effects in the aquatic environment.
R65	Harmful: may cause lung damage if swallowed.
R67	Vapours may cause drowsiness and dizziness.

Safety Phrases (mixture):

S9	Keep container in a well-ventilated place.
S16	Keep away from sources of ignition - No smoking.
S29	Do not empty into drains.
S33	Take precautionary measures against static discharges.
S60	This material and its container must be disposed of as hazardous waste.
S61	Avoid release to the environment. Refer to special instructions/Safety data sheets.
S62	If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

NATIONAL INVENTORY STATUS

U.S. Inventory (TSCA): All components are listed.

TSCA 12(b): Listed.

16. OTHER INFORMATION

Sources:

ChemADVISOR, Inc., MSDS *2,2,4-Trimethylpentane*, 07 September 2010.

ChemADVISOR, Inc., MSDS *Heptane*, 07 September 2010.

International Occupational Safety and Health Information Center, *2,2,4-Trimethylpentane*, October 1999.

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