Date of Issue:
27 February 2015

SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

Product Identifier

SRM Number: 2296
SRM Name: Reformulated Gasoline
(Nominal Mass Fraction 13 % ETBE)
Other Means of Identification: Not applicable.

Recommended Use of This Material and Restrictions of Use

This Standard Reference Material (SRM) is intended primarily for use in the calibration of instruments and the evaluation of methods used for the determination of total sulfur, benzene, toluene, and ethyl *tert*-butyl ether (ETBE) in reformulated gasoline or similar matrix. A unit of SRM 2296 consists of a set of two 20 mL unscored ampoules containing a synthetic gasoline blend of twenty-five organic compounds.

Company Information

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

Telephone: 301-975-2200
FAX: 301-948-3730
E-mail: SRMMSDS@nist.gov
Website: http://www.nist.gov/srm

Emergency Telephone ChemTrec:
1-800-424-9300 (North America)
+1-703-527-3887 (International)

2. HAZARDS IDENTIFICATION

Classification

Physical Hazard:	Flammable liquid	Category 2
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)

H225	Highly 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.
H373	May cause 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.
P233	Keep container tightly closed.
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, 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: Gasoline

Other Designations

Gasoline: Synthetic gasoline blend; reformulated gasoline.
ETBE: 2-Ethoxy-2-methyl propane; 1,1-dimethylethyl ethyl ether; ether, t-butyl ethyl.

Note: This material contains organic compounds, mixed together to create a reformulated gasoline, which have been reported to have toxic, mutagenic, and/or carcinogenic properties, and should be handled with care. The concentrations of these compounds that are not listed in this section are below the reportable limit for hazardous components (1 % or greater) and carcinogens (0.1 % or greater), required by OSHA, 29 CFR 1910.1200 (g)(2)(i)(C)(1), for SDS information. For actual concentrations, see the NIST Certificate of Analysis.

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Gasoline	8006-61-9	232-349-1	87
Ethyl *tert*-butyl ether (ETBE)	637-92-3	211-309-7	13
Individual Components of Reformulated Gasoline in SRM 2296			
2,2,4-Trimethylpentane	540-84-1	208-759-1	12
Cyclohexane	110-82-7	203-806-2	9
Toluene	108-88-3	203-625-9	8
n-Octane	111-65-9	203-892-1	8
2,4-Dimethylpentane	108-08-7	203-548-0	8
n-Heptane	142-82-5	205-563-8	8
m-Xylene and *p*-Xylene	108-38-3 106-42-3	203-576-3 203-396-5	6
n-Decane	124-18-5	204-686-4	4
n-Hexane	110-54-3	203-777-6	4

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
n-Pentane	109-66-0	203-692-4	4
1,2,4-Trimethylbenzene	95-63-6	202-436-9	2
1,3,5-Trimethylbenzene	108-67-8	203-604-4	2
o-Xylene	95-47-6	202-422-2	2
Ethylbenzene	100-41-4	202-849-4	2
1-Heptene	592-76-7	209-767-8	2
2,3-Dimethyl-2-butene	563-79-1	209-263-8	2
1-Pentene	109-67-1	203-694-5	1
Naphthalene	91-20-3	202-049-5	1
Benzene	71-43-2	200-753-7	1
1,2,4,5-Tetramethylbenzene	95-93-2	202-465-7	1

4. First Aid Measures

Description of First Aid Measures

Inhalation: If adverse effects occur, remove to well-ventilated (uncontaminated) area. If breathing is difficult, qualified personnel may administer oxygen. If not breathing, qualified personnel should give artificial respiration. Seek immediate medical attention.

Skin Contact: Rinse affected skin with water for at least 15 minutes, then wash thoroughly with soap or mild detergent and water. If skin irritation persists, seek medical aid and bring the container or label.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Seek immediate medical attention.

Ingestion: Aspiration hazard. Do not induce vomiting. Contact local poison control immediately; if vomiting occurs, keep head lower than hips to prevent aspiration. If unconscious, turn head to side; get medical attention immediately.

Most Important Symptoms/Effects, Acute and Delayed: Aspiration hazard, blood damage, liver damage, central nervous system depression, cancer hazard (in humans).

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: Severe fire hazard. Vapor/air mixtures are explosive above the flash point. Vapors or gases may ignite at distant ignition sources and flash back. See Section 9, "Physical and Chemical Properties" for flammability properties.

Extinguishing Media

Suitable: Regular dry chemical, carbon dioxide, water, or alcohol-resistant foam.
Unsuitable: None listed.

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 = 3 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 (see Section 10, "Stability and Reactivity").

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits			
Components	**OSHA (PEL)**	**ACGIH (TLV)**	**NIOSH (REL)**
Gasoline	There is no PEL for gasoline in general industry in 29 CFR 1910.1000 Z-1 Table.[a]	TWA: 300 ppm STEL: 500 ppm	NOEL[b]
ETBE	NOEL	TWA: 25 ppm	NOEL
Individual Components of Reformulated Gasoline in SRM 2296 with occupational exposure limits.			
Cyclohexane	TWA: 1050 mg/m^3 (300 ppm)	TWA: 100 ppm	TWA: 1050 mg/m^3 (300 ppm) IDLH: 1300 ppm[c]
Toluene	TWA: 200 ppm Ceiling: 300 ppm	TWA: 20 ppm	TWA: 375 mg/m^3 (100 ppm) STEL: 560 mg/m^3 (150 ppm) IDLH: 500 ppm
n-Octane	TWA: 2350 mg/m^3 (500 ppm)	TWA: 300 ppm	TWA: 350 mg/m^3 (75 ppm) Ceiling: 1800 mg/m^3 (385 ppm) [f] IDLH: 1000 ppm [c]
2,4-Dimethylpentane	NOEL	TWA: 400 ppm STEL: 500 ppm	NOEL
n-Heptane	TWA: 2000 mg/m^3 (500 ppm)	TWA: 400 ppm STEL: 500 ppm	TWA: 350 mg/m^3 (85 ppm) Ceiling: 1800 mg/m^3 (440 ppm) [f] IDLH: 750 ppm
o-Xylene, *m*-Xylene, *p*-Xylene	NOEL	100 ppm TWA 150 ppm STEL	TWA: 435 mg/m^3 (100 ppm) STEL: 655 mg/m^3 (150 ppm) IDLH: 900 ppm
n-Hexane	TWA: 1800 mg/m^3 (500 ppm)	50 ppm TWA Skin[d]	TWA: 180 mg/m^3 (50 ppm) IDLH: 1100 ppm[c]
n-Pentane	TWA: 2950 mg/m^3 (1000 ppm)	TWA: 600 ppm	TWA: 350 mg/m^3 (120 ppm) Ceiling:1800 mg/m^3 (610 ppm)[f] IDLH: 1500 ppm[c]
1,2,4-Trimethylbenzene	NOEL	NOEL	TWA: 125 mg/m^3 (25 ppm)
1,3,5-Trimethylbenzene	NOEL	NOEL	TWA: 125 mg/m^3 (25 ppm)
Ethylbenzene	TWA: 435 mg/m^3 (100 ppm)	TWA: 20 ppm	TWA: 435 mg/m^3 (100 ppm) STEL: 545 mg/m^3 (125 ppm) IDLH: 800 ppm[c]
Naphthalene	TWA: 50 mg/m^3 (10 ppm)	TWA: 10 ppm STEL: 15 ppm Skin[d]	TWA: 50 mg/m^3 (10 ppm) STEL: 75 mg/m^3 (15 ppm) IDLH: 250 ppm
Benzene	TWA: 1 ppm STEL: 5 ppm[f] Ceiling: 25 ppm[f] Action level: 0.5 ppm [e]	TWA: 0.5 ppm STEL: 2.5 ppm Skin[d]	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] IDLH based off of 10 % LEL.
[d] Skin – Potential significant contribution to overall exposure by the cutaneous route.
[e] Cancer hazard, flammable, see 29 CFR 1910.1028.
[f] 15 minutes.

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

Properties	**Gasoline (87 % of SRM)**	**ETBE (13 % of SRM)**
Molar Mass (g/mol)	not applicable	102.18
Molecular Formula	not applicable	$C_6H_{14}O$
Appearance (physical state, color, etc.)	clear, colorless to amber liquid	clear, colorless liquid
Odor	gasoline odor	not available
Odor threshold	0.25 ppm	not available
pH	neutral	not available
Evaporation rate	10 to 11 (butyl acetate = 1)	not available
Melting point/freezing point	< –38 °C (< –36.4 °F)	–97 °C to –94 °C (–143 °F to –137 °F)
Relative Density (water = 1)	0.7 to 0.8	0.7364 to 0.742
Density	not available	not available
Vapor Pressure	5 psi to 15 psi	130 to 150 mmHg at 25 °C
Vapor Density (air = 1)	3 to 5	not available
Viscosity	0.5 cSt at 25 °C	not available
Solubilities	water: <0.1 %; soluble in absolute alcohol, ether, chloroform, and benzene	water: 1.2 %
Partition coefficient (n-octanol/water)	not available	not available
Thermal Stability Properties		
Autoignition Temperature	280 °C to 456 °C (536 °F to 853 °F)	not available
Thermal Decomposition	not applicable	not applicable
Initial boiling point and boiling range	38 °C to 204 °C (100 °F to 399 °F)	69 °C to 73 °C (156 °F to 163 °F)
Explosive Limits, LEL (Volume %)	1.2 % to 1.4 %	not available
Explosive Limits, UEL (Volume %)	7.6 %	not available
Flash Point (Closed Cup)	–43 °C to –38 °C (–45 °F to –36 °F)	–19 °C (–2.2 °F)
Flammability (solid, gas)	not applicable	not applicable

10. STABILITY AND REACTIVITY

Reactivity: This material is stable at normal temperatures and pressure.

Stability: X Stable _____ Unstable

Possible Hazardous Reactions: Not applicable.

Conditions to Avoid: Avoid heat, flames, sparks, and other sources of ignition. Minimize contact with material. Avoid inhalation of material or combustion by-products. Keep out of water supplies and sewers.

Incompatible Materials: Oxidizing materials, halogens, metal salts, acids, bases, combustible materials.

Hazardous Decomposition: Oxides of carbon.

Hazardous Polymerization: _____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure: X Inhalation X Skin X Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: Skin irritation, eye irritation, central nervous system depression, and nerve damage.

Potential Health Effects (Acute, Chronic, and Delayed)

Inhalation: Acute exposure may result in irritation, headache, drowsiness, dizziness, vomiting, sleep disturbances, emotional disturbances, tremors, loss of coordination, visual disturbances, chest pain, difficulty breathing, irregular heartbeat, lung congestion, internal bleeding, blood disorders, kidney damage, liver damage, paralysis, brain damage, convulsions, unconsciousness, and coma. Chronic exposure may result in the same effects as acute exposure but with changes in body temperature, changes in blood pressure, loss of appetite, menstrual disorders, nerve damage, reproductive effects, and cancer.

Skin Contact: Acute exposure may cause irritation, skin disorders. Chronic exposure may cause irritation, skin disorders, tingling sensation, and allergic reactions.

Eye Contact: Exposure may result in irritation and other reversible effects.

Ingestion: Aspiration hazard. Exposure may cause the same effects as listed for inhalation. Repeated or prolonged ingestion may result in reproductive effects and cancer.

Numerical Measures of Toxicity

Acute Toxicity: Not classified.

Components	**Acute Toxicity**
Gasoline	Rat, Inhalation, LC50: 300 g/m^3 (5 min)
ETBE	Rat, Oral, LD50: >2000 mg/kg Rat, Inhalation, LC50: 36 200 mg/m^3 (4 h); >5880 mg/m^3 (4 h). Rabbit, Dermal LD50: >2 g/kg
Individual Components of Reformulated Gasoline in SRM 2296 with Acute Toxicity information available are listed.	
2,2,4-Trimethylpentane	Rat, Oral, LD50: >2500 mg/kg Rat, Inhalation, LC50: 34.7 mg/L (4 h); 47.4 mg/L (1 h)
Cyclohexane	Rat, Oral, LD50: >5000 mg/kg Rat, Inhalation, LC50: 13.9 mg/L (4 h); >9500 ppm (4 h) Rabbit, Dermal LD50: >2000 mg/kg
Toluene	Rat, Oral, LD50: 636 mg/kg Rat, Inhalation, LC50: >26 700 ppm (1 h); 12.5 mg/L (4 h); 49 g/m^3 (4 h) Rabbit, Dermal LD50: 8390 mg/kg; 14 100 µL/kg
n-Octane	Rat, Inhalation, LC50: 118 g/m^3 (4 h); 25 260 ppm (4 h)
n-Heptane	Mouse, Oral, LD50: 5000 mg/kg Rat, Inhalation, LC50: 103 g/m^3 (4 h); 48 000 ppm (4 h) Rabbit, Dermal LD50: 3000 mg/kg
m-Xylene and *p*-Xylene	Rat, Oral, LD50: 4988 mg/kg; >3392 mg/kg Rat, Inhalation, LC50: 4550 ppm (4 h); Mouse, Inhalation, LC50: 5267 ppm (6 h) Rabbit, Dermal LD50: 14 100 µL/kg
n-Decane	Rat, Oral, LD50: >5000 mg/kg Rat, Inhalation, LC50: 1369 ppm (8 h); 72 300 mg/m^3 (2 h) Rabbit, Dermal LD50: >2000 mg/kg
n-Hexane	Rat, Oral, LD50: 15 840 mg/kg Rat, Inhalation, LC50: 48 000 ppm (4 h) Rabbit, Dermal LD50: 3000 mg/kg
n-Pentane	Rat, Oral, LD50: >2000 mg/kg Rat, Inhalation, LC50: 364 g/m^3 (4 h) Rabbit, Dermal LD50: 3000 mg/kg
1,2,4-Trimethylbenzene	Rat, Oral, LD50: 3400 mg/kg Rat, Inhalation, LC50: 18 g/m^3 (4 h) Rabbit, Dermal LD50: >3160 mg/kg
1,3,5-Trimethylbenzene	Rat, Oral, LD50: 5000 mg/kg Rat, Inhalation, LC50: 24 g/m^3 (4 h)
o-Xylene	Rat, Oral, LD50: 3567 mg/kg Rat, Inhalation, LC50 2180 ppm (4 h); Mouse, Inhalation, LC50: 4595 ppm (6 h) Rabbit, Dermal LD50: 14 100 µL/kg
Ethylbenzene	Rat, Oral, LD50: 3500 mg/kg Rat, Inhalation, LC50: 17.2 mg/L (4 h) Rabbit, Dermal LD50: 15 354 mg/kg

Components	Acute Toxicity
1-Pentene	Rat, Inhalation, LC50: 175 000 mg/m^3 (4 h)
Naphthalene	Rat, Oral, LD50: 490 mg/kg Rat, Inhalation, LC50: >340 mg/m^3 (1 h) Rabbit, Dermal LD50: >20 g/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
1,2,4,5-Tetramethylbenzene	Rat, Oral, LD50: 5948 mg/kg

Skin corrosion/irritation: Category 2

Gasoline, Rabbit skin: 500 µL (24 h) – mild
Cyclohexane, Rabbit skin: 1548 mg (2 days intermittent)
Toluene, Rabbit skin: 435 mg (24 h) – mild; 20 mg (24 h) – moderate; 500 mg – moderate
m-Xylene, *p*-xylene, Rabbit skin: 20 mg (24 h) – moderate; rabbit open skin: 10 µg (24 h) – severe
n-Decane, Pig, skin: 1200 µL (4 d intermittent) – mild
1,3,5-Trimethylbenzene, Rabbit skin: 20 mg (24 h) – moderate
Ethylbenzene, Rabbit open skin: 15 mg (24 h) – mild
Naphthalene, Rabbit skin: 0.05 mL (24 h) – severe; rabbit open skin: 495 mg – mild
Benzene, Rabbit skin: 20 mg (24 h) moderate; rabbit open skin: 15 mg (24 h) – mild

Serious eye damage/eye irritation: Category 2B

Gasoline, Human eyes: 140 ppm (8 h) – mild; man eyes: 500 ppm (1 h) – moderate
Toluene, Human eyes: 300 ppm; Rabbit eyes: 870 µg – mild
m-Xylene, *p*-xylene, Rabbit eyes: 5 mg (24 h) –severe
n-Hexane, Rabbit eyes: 10 mg – mild; Vapors at 880 ppm for 15 min caused irritation.
1,3,5-Trimethylbenzene, Rabbit eyes: 500 mg (24 h) – mild
Ethylbenzene, Rabbit eyes: 500 mg – severe
Naphthalene, vapor caused irritation at 15 ppm; crystalline naphthalene applied to rabbit eyes cleared and healed completely within 2 weeks.
Benzene, Rabbit eyes: 88 mg – moderate; 2 mg (24 h) severe

Respiratory sensitization: No data available.

Skin sensitization: No data available.

Individuals have reported sensitivity to some of the components.

Germ Cell Mutagenicity: Mutagenic Category 1B

Benzene: cytogenic 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; gasoline, ethylbenzene, and naphthalene are listed by IARC as Group 2b, possibly carcinogenic to humans; ETBE, toluene, m-xylene, p-xylene, o-xylene are listed by IARC as Group 3, not classifiable.

NTP: Benzene is listed by NTP as known human carcinogen; naphthalene is listed by NTP as reasonably anticipated to be a human carcinogen.

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

Reproductive Toxicity: Category 2

ETBE, Rat, Oral TDLo: 16800 mg/kg (14 days)
Cyclohexane, Rat, Inhalation TCLo: 2000 ppm multi-generation; TCLo: 6000 ppm (pregnant 7 to 16 days)
Ethylbenzene, Rat, Inhalation, TCLo: 600 mg/m^3 (24 h, pregnant 7 to 15 days); TCLo: 96 ppm (7 h, pregnant 1 to 19 days)
Toluene, Rat, Inhalation, TCLo: 1500 ppm (7 to 20 days pregnant)
Benzene, Rat Inhalation, TCLo: 50 ppm (24 h, 7 to 14 days pregnant)

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

Gasoline, ETBE, and 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

Gasoline, ETBE, and individual components (2,2,4-trimethylpentane, cyclohexane, toluene, n-octane, 2,4-dimethylpentane, n-heptane, n-decane, n-hexane, n-pentane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, ethylbenzene, and benzene) are aspiration hazards.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data: *Components of Reformulated Gasoline in SRM 2296 with ecotoxicity data are listed.*

Components	Aquatic Toxicity
Gasoline	Fish: 96 Hr LC50 Rainbow trout (*Oncorhynchirus mykiss*): 56 mg/L Algae: 72 Hr EC50 *Pseudokirchneriella subcapitata*: 4700 mg/L
Cyclohexane	Fish: 96 Hr LC50 Fathead minnow (*Pimephales promelas*): 23.03-42.07 mg/L [static] Algae: 72 Hr EC50 *Desmodesmus subspicatus*: >500 mg/L Invertebrate: 24 Hr EC50 Freshwater water flea (*Daphnia magna*): >400 mg/L
Toluene	Fish: 96 Hr LC50 Rainbow trout (*Oncorhynchirus mykiss*): 5.8 mg/L [semi-static] Algae: 96 Hr EC50 *Pseudokirchneriella subcapitata*: >433 mg/L Invertebrate: 48 Hr EC50 Freshwater water flea (*Daphnia magna*): 5.46-9.83 mg/L
n-Octane	Invertebrate: 48 Hr EC50 Freshwater flea (*Daphnia magna*): 0.38 mg/L
n-Heptane	Fish: 96 Hr LC50 Cichlid fish: 375.0 mg/L Invertebrate: 24 Hr EC50 Freshwater water flea (*Daphnia magna*): >10 mg/L
o-Xylene, *m*-Xylene and *p*-Xylene	Fish: 96 Hr LC50 Fathead minnow (*Pimephales promelas*): 13.4 mg/L [flow-through] Invertebrate: 48 Hr EC50 Freshwater water flea (*Daphnia magna*): 3.82 mg/L
n-Decane	Algae: 24 Hr EC50 Chlorella vulgaris: 0.043 mg/L Invertebrate: 48 Hr EC50 Freshwater water flea (*Daphnia magna*): 0.029 mg/L
n-Hexane	Fish: 96 Hr LC50 Fathead minnow (*Pimephales promelas*): 2.1-2.98 mg/L [flow-through] Invertebrate: 24 Hr EC50 Freshwater water flea (*Daphnia magna*): >1000 mg/L
n-Pentane	Fish: 96 Hr LC50 Rainbow trout (*Oncorhynchirus mykiss*): 9.87 mg/L Invertebrate: 48 Hr EC50 Freshwater water flea (*Daphnia magna*): 9.74 mg/L
1,2,4-Trimethylbenzene	Fish: 96 Hr LC50 Fathead minnow (*Pimephales promelas*): 7.19-8.28 mg/L [flow-through] Invertebrate: 48 Hr EC50 Freshwater water flea (*Daphnia magna*): 6.14 mg/L
1,3,5-Trimethylbenzene	Fish: 96 Hr LC50 Fathead minnow (*Pimephales promelas*): 3.48 mg/L Invertebrate: 24 Hr EC50 Freshwater water flea (*Daphnia magna*): 50 mg/L
Ethylbenzene	Fish: 96 Hr LC50 Fathead minnow (*Pimephales promelas*): 7.55-11 mg/L [flow-through]
1-Heptene	Fish: 96 Hr LC50 Zebrafish (*Brachydanio rerio*): 100 mg/L [static] Algae: 96 Hr EC50 *Pseudokirchneriella subcapitata*: 200 mg/L Invertebrate: 48 Hr EC50 Freshwater water flea (*Daphnia magna*): 6 mg/L
Naphthalene	Fish: 96 Hr LC50 Fathead minnow (*Pimephales promelas*): 5.74-6.44 mg/L [flow-through] Algae: 72 Hr EC50 *Skeletonema costatum*: 0.4 mg/L Invertebrate: 48 Hr EC50 Freshwater water flea (*Daphnia magna*): 1.96 mg/L [flow-through]
Benzene	Fish: 96 Hr LC50 Rainbow trout (*Oncorhynchirus mykiss*): 5.3 mg/L [flow-through] Algae: 72 Hr EC50 *Pseudokirchneriella subcapitata*: 29 mg/L Invertebrate: 48 Hr EC50 Freshwater water flea (*Daphnia magna*): 9–16 mg/L [static]

Persistence and Degradability: No data available.

Bioaccumulative Potential: Bioconcentration factors: xylene (0.6 to 15), ethylbenzene (15, species fish), naphthalene (30 to 430, species fish), 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:

Gasoline:	Hazardous waste number D018 for concentrations at or above the regulatory level (0.05 mg/L); Hazardous waste number D001.
Toluene	Hazardous waste number U220.
Xylene	Hazardous waste number U239, ignitable waste.
Cyclohexane	Hazardous waste number U056, ignitable waste.
Naphthalene	Hazardous waste number U165, ignitable waste.
Benzene	Hazardous waste number U019, ignitable waste, toxic waste, regulatory level 0.5 mg/L.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: UN1203; Gasoline; Hazard Class 3; Packing Group II.

15. REGULATORY INFORMATION

U.S. Regulations

CERCLA Sections 102a/103 (40 CFR 302.4): Final RQ listed below.

2,2,4-Trimethylpentane	1000 lbs (454 kg)
Cyclohexane:	1000 lbs (454 kg)
Toluene:	1000 lbs (454 kg)
o-Xylene, m-Xylene, and p-Xylene:	100 lbs (45.4 kg)
n-Hexane:	5000 lbs (2270 kg)
Ethylbenzene:	1000 lbs (454 kg)
Naphthalene:	100 lbs (45.4 kg)
Benzene:	10 lbs (4.54 kg)

SARA Title III Section 302 (40 CFR 355.30): None of the components are regulated.

SARA Title III Section 304 (40 CFR 355.40): None of the components are regulated.

SARA Title III Section 313 (40 CFR 372.65):

Cyclohexane:	1.0 % de minimis concentration
Toluene:	1.0 % de minimis concentration
o-Xylene, m-Xylene and p-Xylene:	1.0 % de minimis concentration
n-Hexane:	1.0 % de minimis concentration
1,2,4-Trimethylbenzene:	1.0 % de minimis concentration
Ethylbenzene:	0.1 % de minimis concentration
Naphthalene:	0.1 % de minimis concentration
Benzene:	0.1 % de minimis concentration

OSHA Process Safety (29 CFR 1910.119): None of the components are regulated.

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, toluene) known to the state of California to cause reproductive developmental effects.

WARNING! This product contains chemicals (benzene, naphthalene, ethylbenzene) known to the state of California to cause cancer.

U.S. TSCA Inventory: Gasoline, ETBE, 2,2,4-trimethylpentane, cyclohexane, toluene, *n*-octane, 2,4-dimethylpentane, *n*-heptane, *o*-xylene, *m*-xylene, *p*-xylene, *n*-decane, *n*-hexane, *n*-pentane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, ethylbenzene, 1-heptene, 2,3-dimethyl-2-butene, 1-pentene, naphthalene, benzene, 1,2,4,5-tetramethylbenzene are listed.

T**SCA 12(b), Export Notification:** Heptane 1 % de minimus concentration; pentane 1 % de minimus

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

16. OTHER INFORMATION

Issue Date: 27 February 2015

Sources:
ChemADVISOR, Inc., SDS *2,3-Dimethyl-2-butene*, 15 December 2014.
ChemADVISOR, Inc., SDS *2,4-Dimethylpentane*, 15 December 2014.
ChemADVISOR, Inc., SDS *1,2,4-Trimethylbenzene*, 15 December 2014.
ChemADVISOR, Inc., SDS *1,2,4,5-Tetramethylbenzene*, 15 December 2014.
ChemADVISOR, Inc., SDS *1,3,5-Trimethylbenzene*, 15 December 2014.
ChemADVISOR, Inc., SDS *2,2,4-Trimethylpentane*, 15 December 2014.
ChemADVISOR, Inc., SDS *Benzene*, 11 September 2013.
ChemADVISOR, Inc., SDS *Cyclohexane*, 15 December 2014.
ChemADVISOR, Inc., SDS *n-Decane*, 15 December 2014.
ChemADVISOR, Inc., SDS *Ethyl Benzene*, 15 December 2014.
ChemADVISOR, Inc., SDS *Gasoline, Automotive, Unleaded*, 15 December 2014.
ChemADVISOR, Inc., SDS *Heptane*, 15 December 2014.
ChemADVISOR, Inc., SDS *Heptene Isomers*, 15 December 2014.
ChemADVISOR, Inc., SDS *n-Hexane*, 15 December 2014.
ChemADVISOR, Inc., SDS *Ethyl tert-butyl ether*, 15 December 2014.
ChemADVISOR, Inc., SDS *m-Xylene*, 15 December 2014.
ChemADVISOR, Inc., SDS *p-Xylene*, 15 December 2014.
ChemADVISOR, Inc., SDS *o-Xylene*, 15 December 2014.
ChemADVISOR, Inc., SDS *Naphthalene*, 15 December 2014.
ChemADVISOR, Inc., SDS *Octane*, 15 December 2014.
ChemADVISOR, Inc., SDS *Pentane*, 15 December 2014.
ChemADVISOR, Inc., SDS *1-Pentene*, 15 December 2014.
ChemADVISOR, Inc., SDS *Toluene*, 15 December 2014.
ChemADVISOR, Inc., SDS *Xylene*, 15 December 2014.

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 Transportation Agency	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 %	STOT	Specific Target Organ Toxicity
LEL	Lower Explosive Limit	TLV	Threshold Limit Value
MSDS	Material Safety Data Sheet	TPQ	Threshold Planning Quantity
NFPA	National Fire Protection Association	TSCA	Toxic Substances Control Act
NIOSH	National Institute for Occupational Safety and Health	TWA	Time Weighted Average
NIST	National Institute of Standards and Technology	UEL	Upper Explosive Limit
n.o.s.	Not Otherwise Specified	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 http://www.nist.gov/srm.