

MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material name ETHANOL (FUEL GRADE) UNBRANDED
MSDS number 5393
Version # 16
Revision date 11-18-2010
CAS # 64-17-5
Synonym(s) DENATURED FUEL ETHANOL * ETHANOL - DENATURED * ETHYL ALCOHOL (FUEL GRADE)
Supplier Flint Hills Resources, LP
4111 E. 37th St. North
Wichita, KS
67220-3203 US

Telephone numbers - 24 hour emergency assistance

Chemtrec 800-424-9300

Telephone numbers - general assistance

8-5 (M-F, CST) MSDS Assistance 316-828-7988
Email: msdsrequest@fhr.com

2. Hazards Identification

Emergency overview

DANGER!

CLEAR, COLORLESS LIQUID WITH MILD ODOR

HEALTH HAZARDS

VAPORS MAY CAUSE EYE AND RESPIRATORY TRACT IRRITATION
BREATHING HIGH CONCENTRATIONS CAN CAUSE IRREGULAR HEARTBEATS WHICH MAY BE FATAL
MAY BE HARMFUL OR FATAL IF SWALLOWED
MAY CAUSE LUNG DAMAGE
OVEREXPOSURE MAY CAUSE CNS DEPRESSION
SEE "TOXICOLOGICAL INFORMATION" (SECTION 11) FOR MORE INFORMATION

FLAMMABILITY HAZARDS

EXTREMELY FLAMMABLE LIQUID AND VAPOR
VAPOR MAY CAUSE FLASH FIRE OR EXPLOSION

REACTIVITY HAZARDS

STABLE

Potential health effects

Routes of exposure

Inhalation, ingestion, skin and eye contact.

Eyes

Contact may cause pain and severe reddening and inflammation of the conjunctiva. Effects may become more serious with repeated or prolonged contact.

Skin

Contact may cause reddening, itching and inflammation. Skin contact may cause harmful effects in other parts of the body.

Inhalation

Breathing high concentrations may be harmful.

May cause central nervous system depression or effects. Symptoms may include headache, excitation, euphoria, dizziness, incoordination, drowsiness, light-headedness, blurred vision, fatigue, tremors, convulsions, loss of consciousness, coma, respiratory arrest and death, depending on the concentration and duration of exposure.

Breathing high concentrations of this material, for example, in a confined space or by intentional abuse, can cause irregular heartbeats which can cause death.

Overexposure to this material may cause systemic damage including target organ effects listed under "Toxicological Information" (Section 11).

Ingestion

Swallowing this material may be harmful. May cause irritation of the mouth, throat and gastrointestinal tract. Symptoms may include salivation, pain, nausea, vomiting and diarrhea.

Aspiration into lungs may cause chemical pneumonia and lung damage.

Exposure may also cause central nervous system symptoms similar to those listed under "Inhalation" (see Inhalation section).

3. Composition / Information on Ingredients

Components	CAS #	Concentration*
ETHYL ALCOHOL	64-17-5	< 100 %
DENATURANT	Mixture	1.9 - 2.5 %
BENZENE	71-43-2	< 600 ppm

*Values do not reflect absolute minimums and maximums; these values are typical which may vary from time to time.

Composition comments

This Material Safety Data Sheet is intended to communicate potential health hazards and potential physical hazards associated with the product(s) covered by this sheet, and is not intended to communicate product specification information. For product specification information, contact your Flint Hills Resources, LP representative.

4. First Aid Measures

First aid procedures

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. Get medical attention if irritation persists.

Skin contact

Immediately wash skin with plenty of soap and water after removing contaminated clothing and shoes. Get medical attention if irritation develops or persists.

Inhalation

Place contaminated clothing in closed container for storage until laundered or discarded. If clothing is to be laundered, inform person performing operation of contaminant's hazardous properties. Discard contaminated leather goods.

Remove to fresh air. If not breathing, institute rescue breathing. If breathing is difficult, ensure airway is clear and give oxygen. If heart has stopped, immediately begin cardiopulmonary resuscitation (CPR).

Ingestion

Keep affected person warm and at rest. GET IMMEDIATE MEDICAL ATTENTION.

Do not induce vomiting because of danger of aspirating liquid into lungs, causing serious damage and chemical pneumonitis. If spontaneous vomiting occurs, keep head below hips to prevent aspiration and monitor for breathing difficulty.

Never give anything by mouth to an unconscious person.

Notes to physician

Keep affected person warm and at rest. GET IMMEDIATE MEDICAL ATTENTION.

INHALATION: This material (or a component) sensitizes the myocardium to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. Administration of sympathomimetic drugs should be avoided.

INGESTION: If ingested this material represents a significant aspiration and chemical pneumonitis hazard. Induction of emesis is not recommended.

5. Fire Fighting Measures

Flammable properties

Extremely flammable. Vapors form flammable or explosive mixtures with air at room temperature. Vapor or gas may spread to distant ignition sources and flash back.

Explosion hazard if exposed to extreme heat.

Extinguishing media

Suitable extinguishing media

Use dry chemical, CO₂, water spray, or alcohol-resistant foam to extinguish fire.

Protection of firefighters**Specific hazards arising from the chemical**

Combustion may produce CO_x, NO_x, SO_x, reactive hydrocarbons, irritating vapors, and other decomposition products in the case of incomplete combustion.

Fire fighting equipment/instructions

Material will burn in a fire.

Evacuate area and fight fire from a safe distance.

If leak or spill has not ignited, ventilate area and use water spray to disperse gas or vapor and to protect personnel attempting to stop a leak.

Use water spray to cool adjacent structures and to protect personnel. Shut off source of flow if possible. Stay away from storage tank ends. Withdraw immediately in case of rising sound from venting safety device or any discoloration of storage tank due to fire.

Firefighters must wear NIOSH approved positive pressure breathing apparatus (SCBA) with full face mask and full protective equipment.

6. Accidental Release Measures**Environmental precautions**

Eliminate all sources of ignition. Isolate hazard area and deny entry.

If material is released to the environment, take immediate steps to stop and contain release. Caution should be exercised regarding personnel safety and exposure to the released material. Notify local authorities and the National Response Center, if required.

If the material is spilled or allowed to leak from storage or containment it can contaminate soil and ground water. Ensure the storage or containment equipment is suitable for safely holding this material.

Other information

Keep unnecessary people away. Isolate area for at least 50 meters (164 feet) in all directions to preserve public safety. For large spills, if downwind consider initial evacuation for at least 300 meters (1000 feet).

Keep ignition sources out of area and shut off all ignition sources. Absorb spill with inert material (e. g. dry sand or earth) then place in a chemical waste container. Large Spills: Dike far ahead of liquid spill for later disposal.

Use a vapor suppressing foam to reduce vapors. Stop leak when safe to do so.

See Exposure Controls/Personal Protection (Section 8).

Emergency action

Eliminate and/or shut off ignition sources and keep ignition sources out of the area. Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind. Isolate for 800 meters (1/2 mile) in all directions if tank, rail car or tank truck is involved in fire. Evacuate area endangered by release as required. (See Exposure Controls/Personal Protection, Section 8.)

7. Handling and Storage**Handling**

Bond and ground lines and equipment (tank, transfer lines, pump, floats, etc.) used during transfer to reduce the possibility of static spark-initiated fire or explosion. Additional precautions should be considered consistent with the current NFPA 77, Recommended Practice on Static Electricity, the current API Recommended Practice 2003, Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents and OSHA Standard 29 CFR 1910.106, Flammable and Combustible Liquids.

Use non-sparking tools. Do not cut, grind, drill, weld or reuse containers unless adequate precautions are taken against these hazards.

Do not eat, drink or smoke in areas of use or storage.

Storage

Store in tightly closed containers in a cool, dry, isolated, well-ventilated area away from heat, sources of ignition and incompatibles. Avoid contact with strong oxidizers.

Empty containers may contain material residue. Do not reuse without adequate precautions.

Do not eat, drink or smoke in areas of use or storage.

8. Exposure Controls / Personal Protection

Occupational exposure limits

ACGIH

Components	Type	Value	Form
BENZENE (71-43-2)	STEL	2.5 ppm	Skin
	TWA	0.5 ppm	Skin
ETHYL ALCOHOL (64-17-5)	STEL	1000.0 ppm	

U.S. - OSHA

Components	Type	Value	Form
BENZENE (71-43-2)	Ceiling	25.0 ppm	Skin
	STEL	5.0 ppm	Skin
	TWA	1.0 ppm	Skin
ETHYL ALCOHOL (64-17-5)	PEL	1000.0 ppm	
		1900.0 mg/m3	

U.S. - Minnesota (MNOSHA)

Components	Type	Value
BENZENE (71-43-2)	STEL	5.0 ppm
	TWA	1.0 ppm
ETHYL ALCOHOL (64-17-5)	TWA	1000.0 ppm
		1900.0 mg/m3

Engineering controls

Ventilation and other forms of engineering controls are the preferred means for controlling exposures.

Personal protective equipment

Eye / face protection

Keep away from eyes. Eye contact can be avoided by using indirect-vent goggles and/or face shield. Have eye washing facilities readily available where eye contact can occur.

Skin protection

Avoid skin contact with this material. Use appropriate chemical protective gloves when handling. Additional protective clothing may be necessary.

Dermal exposure to this chemical may add to the overall exposure.

Good personal hygiene practices such as properly handling contaminated clothing, using wash facilities before entering public areas and restricting eating, drinking and smoking to designated areas are essential for preventing personal chemical contamination.

Respiratory protection

A NIOSH approved air purifying respirator with an appropriate cartridge or canister, such as an organic vapor cartridge, may be used in circumstances where airborne concentrations may exceed exposure limits. Protection provided by air purifying respirators is limited. Use a positive pressure air supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection. See OSHA 29 CFR 1910.134 for more information regarding respiratory protection and Assigned Protection Factors (APFs).

9. Physical & Chemical Properties

Color	Clear, colorless
Odor	Mild
Odor threshold	Not available
Physical state	Liquid
Form	Not applicable
pH	Not available
Melting point	Not available
Freezing point	Not available
Boiling point	> 150 °F (> 65.6 °C)
Flash point	< 32 °F (< 0 °C) Pensky-Martens Closed Cup (ASTM D93)
Evaporation rate	Not available
Flammability limits in air, upper, % by volume	19 %
Flammability limits in air, lower, % by volume	1.4 %

Vapor pressure	Not available
Vapor density	Not available
Specific gravity	0.791 - 0.793
Relative density	Not available
Solubility (water)	Very soluble
Partition coefficient (n-octanol/water)	Not available
Auto-ignition temperature	Not available
Decomposition temperature	Not available
VOC	Not available
Density	Not available
Conductivity	> 2000 pS/m
Surface tension	Not available
Percent volatile	100 %
Chemical family	Alcohol with hydrocarbon

10. Chemical Stability & Reactivity Information

Chemical stability	Stable
Conditions to avoid	Avoid high temperatures, open flames, sparks and the use of ungrounded electrical equipment.
Incompatible materials	Avoid contact with strong oxidizing agents and strong reducing agents. See precautions under Handling & Storage (Section 7).
Hazardous decomposition products	Not anticipated under normal conditions.
Possibility of hazardous reactions	Will not occur.

11. Toxicological Information

Sensitization

US ACGIH Threshold Limit Values: Skin designation

BENZENE (CAS 71-43-2)	Can be absorbed through the skin.
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Carcinogenicity

ACGIH Carcinogens

BENZENE (CAS 71-43-2)	A1 Confirmed human carcinogen.
ETHYL ALCOHOL (CAS 64-17-5)	A3 Confirmed animal carcinogen with unknown relevance to humans.

IARC Monographs. Overall Evaluation of Carcinogenicity

BENZENE (CAS 71-43-2)	1 Carcinogenic to humans.
ETHYL ALCOHOL (CAS 64-17-5)	1 Carcinogenic to humans.

US NTP Report on Carcinogens: Known carcinogen

BENZENE (CAS 71-43-2)	Known carcinogen.
ETHYL ALCOHOL (CAS 64-17-5)	Known carcinogen.

US OSHA Specifically Regulated Substances: Cancer hazard

BENZENE (CAS 71-43-2)	Cancer hazard.
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Pre-existing conditions aggravated by exposure	Pre-existing medical conditions which may be aggravated by exposure include disorders of the blood, bone marrow, liver, respiratory tract, skin, and kidneys.
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Toxicological data

ETHYL ALCOHOL: Repeated ingestion of ethanol can result in alcohol abuse, causing behavioral changes, memory loss, impaired judgement, decreased appetite, irregular heartbeats, and decreased fertility. Prolonged and repeated ingestion of ethanol has also been associated with cancers of the mouth, pharynx, esophagus and liver. Ethanol ingestion by pregnant women can cause miscarriage, low birth weight, premature birth and fetal alcohol syndrome. In males, acute and chronic alcohol ingestion may affect gonadal hormone levels. It may also affect the liver, kidney, brain, blood and cardiovascular system.

BENZENE: Studies of Workers Overexposed to Benzene: Studies of workers exposed to benzene show clear evidence that overexposure can cause cancer of the blood forming organs (acute myelogenous leukemia) and aplastic anemia, an often fatal disease. Some studies suggest overexposure to benzene may also be associated with other blood disorders including myelodysplastic syndrome. Some studies of workers exposed to benzene have shown an association with increased rates of chromosome aberrations in circulating lymphocytes. One study of women workers exposed to benzene suggested a weak association with irregular menstruation. However, other studies of workers exposed to benzene have not demonstrated clear evidence of an effect on fertility or reproductive outcome in humans. Benzene can cross the placenta and affect the developing fetus. Cases of aplastic anemia have been reported in the offspring of persons severely overexposed to benzene. Studies in Laboratory Animals: Studies in laboratory animals indicate that prolonged, repeated exposure to high levels of benzene vapor can cause bone marrow suppression and cancer in multiple organ systems. Studies in laboratory animals show evidence of adverse effects on male reproductive organs following high levels of exposure but no significant effects on reproduction have been observed. Embryotoxicity has been reported in studies of laboratory animals but effects were limited to reduced fetal weight and skeletal variations. Benzene has been classified as a proven human carcinogen by OSHA and a Group 1 (Carcinogenic to Humans) material by IARC.

NAPHTHAS: In a large epidemiological study on over 15,000 employees at several petroleum refineries and amongst residents located near these refineries, no increased risk of kidney cancer was observed in association with gasoline exposures (a similar material). In a similar study, no increased risk of kidney cancer was observed among petroleum refinery workers, but there was a slight trend in the incidence of kidney cancers among service station employees, especially after a 30-year latency period.

Altered mental state, drowsiness, peripheral motor neuropathy, irreversible brain damage (so-called Petrol Sniffers Encephalopathy), delirium, seizures, and sudden death have been reported from repeated overexposure to some hydrocarbon solvents, naphthas, and gasoline.

Exposure to this material may cause adverse effects or damage to the following organs or organ systems: central nervous system, eyes, skin, central nervous system, heart, cardiovascular system, liver, brain, reproductive system, mouth, esophagus, pharynx, kidneys, respiratory tract, blood, and bone marrow.

12. Ecological Information

Ecotoxicity	May be harmful to aquatic organisms.
Persistence and degradability	Readily biodegradable in the environment. The presence of ethanol in this product may impede the biodegradation of benzene, toluene, ethylbenzene and xylene in groundwater, resulting in elongated plumes of these constituents.
Bioaccumulation / Accumulation	Not likely to bioaccumulate in aquatic organisms.
Mobility in environmental media	This product evaporates readily.

13. Disposal Considerations

Disposal instructions

This material, as supplied, when discarded or disposed of, is a hazardous waste according to Federal Regulations due to the material exhibiting a hazardous characteristic under Subpart C of 40 CFR 261. Under RCRA, it is the responsibility of the user of the material to determine, at the time of disposal, whether the material meets RCRA criteria for hazardous waste.

The transportation, storage, treatment and disposal of RCRA waste material must be conducted in compliance with 40 CFR 262, 263, 264, 268 and 270. Check state and local regulations for any additional requirements as these may be more restrictive than federal laws and regulations. Chemical additions, processing or otherwise altering this material may make the waste management information presented in this MSDS incomplete, inaccurate or otherwise inappropriate. Disposal of this material must be conducted in compliance with all federal, state and local regulations.

For additional handling information and protection of employees, see Section 7 (Handling and Storage) and Section 8 (Exposure Controls/Personal Protection).

14. Transport Information

DOT

Basic shipping requirements:

UN number	UN1987
Proper shipping name	Alcohols, n.o.s. (Ethanol, Gasoline), RQ (Benzene)
Hazard class	3
Packing group	II
Labels required	Flammable Liquid
Placards required	Flammable Liquid, UN1987

Additional information:

ERG number	127
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DOT

General

The above description may not cover shipping in all cases, please consult 49 CFR 100-185 for specific shipping information.

15. Regulatory Information

US federal regulations

All ingredients are on the TSCA inventory, or are not required to be listed on the TSCA inventory.

Consult OSHA's Benzene standard 29 CFR 1910.1028 for provisions on air monitoring, employee training, medical monitoring, etc.

This material contains toxic chemical(s) in excess of the applicable de minimis concentration that are subject to the annual toxic chemical release reporting requirements of the Superfund Amendments and Reauthorization Act (SARA) Section 313 (40 CFR 372). This information must be included in all MSDSs that are copied and distributed for this material.

This material contains one or more substances listed as hazardous air pollutants under Section 112 of the Clean Air Act. This material contains up to 100% volatile organic compounds (VOCs) per 40 CFR Part 51.100. This material contains up to <1% hazardous air pollutants (HAPs) per Section 112 Clean Air Act Amendments of 1990.

Check local, regional or state/provincial regulations for any additional requirements as these may be more restrictive than federal laws and regulations. Failure to report may result in substantial civil and criminal penalties.

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: De minimis concentration

BENZENE (CAS 71-43-2)

0.1 %

CERCLA (Superfund) reportable quantity

BENZENE: 10.0

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - Yes
Pressure Hazard - No
Reactivity Hazard - No

State regulations

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

16. Other Information

NFPA ratings

Health: 1
Flammability: 3
Instability: 0

HMIS® ratings

Health: 1*
Flammability: 3
Physical hazard: 0
* Indicates chronic health hazard

Disclaimer

NOTICE: The information presented herein is based on data considered to be accurate as of the date of preparation of this Material Safety Data Sheet. Adequate training and instruction should be given by you to your employees and affected personnel. Appropriate warnings and safe handling procedures should be provided by you to handlers and users. Additionally, the user should review this information, satisfy itself as to its suitability and completeness, and pass on the information to its employees or customers in accordance with the applicable federal, state, provincial or local hazard communication requirements. This MSDS may not be used as a commercial specification sheet of manufacturer or seller, and no warranty or representation, expressed or implied, is made as to the accuracy or comprehensiveness of the foregoing data and safety information, nor is any authorization given or implied to practice any patented invention without a license. In addition, vendor neither assumes nor retains any responsibility for any damage or injury resulting from abnormal use, from any failure to adhere to appropriate practices, or from any hazards inherent in the nature of the material. Moreover, unless an employee or a customer accesses or receives a MSDS directly from the company, there is no assurance that a document obtained from alternate sources is the most currently available MSDS.

Further information

WARNING -- WARNING: THIS PRODUCT, AS INDICATED, CONTAINS ETHANOL. ETHANOL, OR FUELS BLENDED WITH ETHANOL, MAY DAMAGE OR HARM FUEL STORAGE TANKS, PIPING, METERS, ENGINES AND/OR RELATED FUEL SYSTEMS (INCLUDING, BUT NOT LIMITED TO MARINE EQUIPMENT). IT IS IMPERATIVE THAT BEFORE YOU USE OR STORE THIS PRODUCT YOU CONDUCT AN ASSESSMENT TO DETERMINE WHETHER THIS FUEL IS COMPATIBLE WITH YOUR PARTICULAR EQUIPMENT/MACHINERY IN WHICH THIS FUEL MIGHT BE STORED, TRANSPORTED OR COMBUSTED.

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Issue date

11-18-2010

This data sheet contains changes from the previous version in section(s):

This document has undergone significant changes and should be reviewed in its entirety.

Completed by

Flint Hills Resources, LP - Operations EH&S