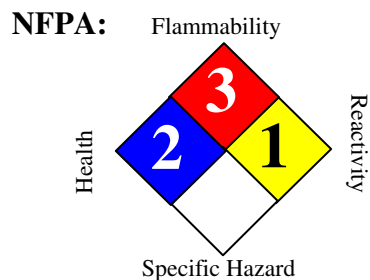


Material Safety Data Sheet

Ethanol



HMIS III:

| | |
|--------------|---|
| HEALTH | 2 |
| FLAMMABILITY | 3 |
| PHYSICAL | 1 |

0 = Insignificant, 1 = Slight, 2 = Moderate, 3 = High, 4 = Extreme

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

| | | | | | |
|--------------------------------|---|---|-------------------------------------|---|----------------|
| Product name | : | Ethanol | | | |
| Synonyms | : | Ethyl Alcohol and Gasoline Mixture, Motor Fuel Ethanol; Denatured (with Gasoline) Ethanol, 888100004475 | | | |
| MSDS Number | : | 888100004475 | Version | : | 2.8 |
| Product Use Description | : | Fuel | | | |
| Company | : | For: Tesoro Refining & Marketing Co. 300 Concord Plaza Drive, San Antonio, TX 78216-6999 | | | |
| Tesoro Call Center | : | (877) 783-7676 | Chemtrec (Emergency Contact) | : | (800) 424-9300 |

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

| | | |
|--------------------------|---|---|
| Regulatory status | : | This material is considered hazardous by the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (29 CFR 1910.1200). |
| Signal Word | : | DANGER |
| Hazard Summary | : | Flammable. Highly Toxic. Contains trace components that may cause cancer. |

Potential Health Effects

| | | |
|-------------------------|---|--|
| Eyes | : | May cause eye irritation. |
| Skin | : | May cause skin irritation. Can be absorbed through skin. |
| Ingestion | : | May be fatal if swallowed. |
| Chronic Exposure | : | Repeated over-exposure can damage liver, kidneys and central nervous system. |
| Target Organs | : | Skin, Central nervous system, Eyes |

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

| Component | CAS-No. | Weight % |
|--|-----------|----------|
| Ethanol; Ethyl alcohol | 64-17-5 | 90 - 95% |
| Gasoline, natural; Low boiling point naphtha | 8006-61-9 | 5 - 7% |

| | | |
|---------|-----------|-------------|
| Pentane | 109-66-0 | 0.0 - 1% |
| Benzene | 71-43-2 | 0.0 - 0.75% |
| Toluene | 108-88-3 | 0.0 - 0.75% |
| Butane | 106-97-8 | 0.1 - 0.75% |
| Xylene | 1330-20-7 | 0.0 - 0.75% |

SECTION 4. FIRST AID MEASURES

- Inhalation** : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water. Take off contaminated clothing and shoes immediately. Wash contaminated clothing before re-use. Contaminated leather, particularly footwear, must be discarded. Note that contaminated clothing may be a fire hazard. If skin irritation persists, seek medical attention.
- Eye contact** : Remove contact lenses. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If eye irritation persists, seek medical attention.
- Ingestion** : If swallowed Do NOT induce vomiting. Aspiration of material into lungs can cause pulmonary edema. Never give anything by mouth to an unconscious person. Seek medical attention immediately.
- Notes to physician** : Symptoms: Pulmonary edema, Discomfort, Dermatitis, Kidney disorders, Liver disorders

SECTION 5. FIRE-FIGHTING MEASURES

- Form** : Liquid
- Flash point** : < -40 °C (< -40 °F)
- Auto Ignition temperature** : 248.9 °C (480.0 °F)
- Lower explosive limit** : 1.3 %(V)
- Upper explosive limit** : 19 %(V)
- Suitable extinguishing media** : Carbon dioxide blanket, Water spray, Dry chemical, Foam, SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or Halon. LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.
- Specific hazards during fire fighting** : Fire Hazard Fire will produce dense black smoke containing hazardous combustion products (see heading 10). Flash back possible over considerable distance.
- Special protective equipment for fire-fighters** : Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus and fully protective clothing such as bunker gear if needed to prevent exposure.

Further information : Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam. Exposure to decomposition products may be a hazard to health. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers. Fire residues and contaminated fire extinguishing water may be subject to disposal regulations.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions : Evacuate personnel to safe areas. Ventilate the area. Remove all sources of ignition. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

Environmental precautions : Do not contaminate surface water. Should not be released into the environment. Authorities should be advised if significant releases cannot be contained.

Methods for cleaning up : Contain and collect spillage with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations.

CERCLA Hazardous substances and corresponding RQs :

| | | |
|--|-----------|-----------|
| Ethanol; Ethyl alcohol | 64-17-5 | 100 lbs |
| Gasoline, natural; Low boiling point naphtha | 8006-61-9 | 100 lbs |
| Toluene | 108-88-3 | 1,000 lbs |
| Xylene | 1330-20-7 | 100 lbs |
| Benzene | 71-43-2 | 10 lbs |

SECTION 7. HANDLING AND STORAGE

Handling : Keep away from fire, sparks and heated surfaces. No smoking near areas where material is stored or handled. The product should only be stored and handled in areas with intrinsically safe electrical classification.

Advice on protection against fire and explosion : Hydrocarbon liquids including this product can act as a non-conductive flammable liquid (or static accumulators), and may form ignitable vapor-air mixtures in storage tanks or other containers. Precautions to prevent static-initated fire or explosion during transfer, storage or handling, include but are not limited to these examples:

- (1) Ground and bond containers during product transfers. Grounding and bonding may not be adequate protection to prevent ignition or explosion of hydrocarbon liquids and vapors that are static accumulators.
- (2) Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil or diesel) is loaded into tanks previously containing low flash point products (such gasoline or naphtha).
- (3) Storage tank level floats must be effectively bonded.

For more information on precautions to prevent static-initated fire or explosion, see NFPA 77, Recommended Practice on Static Electricity (2007), and API Recommended Practice 2003, Protection Against Ignitions Arising Out of Static,

Lightning, and Stray Currents (2008).

- Dust explosion class** : Not applicable
- Requirements for storage areas and containers** : Keep away from flame, sparks, excessive temperatures and open flame. Use approved containers. Keep containers closed and clearly labeled. Empty or partially full product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose containers to sources of ignition. Store in a well-ventilated area. The storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".
- Advice on common storage** : Keep away from food, drink and animal feed. Incompatible with oxidizing agents. Incompatible with acids.
- Other data** : No decomposition if stored and applied as directed.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines

| List | Components | CAS-No. | Type: | Value |
|---------|------------------------|-----------|----------|-----------------------|
| OSHA | Benzene | 71-43-2 | TWA | 1 ppm |
| | | 71-43-2 | STEL | 5 ppm |
| | | 71-43-2 | OSHA_ACT | 0.5 ppm |
| OSHA Z1 | Ethanol; Ethyl alcohol | 64-17-5 | PEL | 1,000 ppm 1,900 mg/m3 |
| | Xylene | 1330-20-7 | PEL | 100 ppm 435 mg/m3 |
| ACGIH | Ethanol; ethyl alcohol | 64-17-5 | TWA | 1,000 ppm |
| | Toluene | 108-88-3 | TWA | 50 ppm |
| | Xylene | 1330-20-7 | TWA | 100 ppm |
| | | 1330-20-7 | STEL | 150 ppm |
| | Benzene | 71-43-2 | TWA | 0.5 ppm |
| 71-43-2 | | STEL | 2.5 ppm | |

- Engineering measures** : Use adequate ventilation to keep gas and vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces. Use only intrinsically safe electrical equipment approved for use in classified areas.
- Eye protection** : Safety glasses or goggles are recommended where there is a possibility of splashing or spraying. Ensure that eyewash stations and safety showers are close to the workstation location.
- Hand protection** : Gloves constructed of nitrile or neoprene are recommended. Consult manufacturer specifications for further information.

- Skin and body protection** : If needed to prevent skin contact, chemical protective clothing such as of DuPont TyChem®, Saranex or equivalent recommended based on degree of exposure. The resistance of specific material may vary from product to product as well as with degree of exposure.
- Respiratory protection** : A NIOSH/ MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, ANSI Z88.2-1992, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection. Use a NIOSH/ MSHA-approved positive-pressure supplied-air respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.
- Work / Hygiene practices** : Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

- Form** : Liquid
- Appearance** : Clear
- Odor** : Characteristic hydrocarbon-like
- Flash point** : < -40 °C (< -40 °F)
- Auto Ignition temperature** : 248.9 °C (480.0 °F)
- Thermal decomposition** : No decomposition if stored and applied as directed.
- Lower explosive limit** : 1.3 %(V)
- Upper explosive limit** : 19 %(V)
- pH** : Not applicable
- Freezing point** : -81 °C (-114 °F)
- Boiling point** : 37.8 - 80 °C(100.0 - 176 °F)
- Vapor Pressure** : 533.29 - 750.06 hPa
at 37.8 °C (100.0 °F)
- Relative Vapor Density** : 1.6 (Air = 1.0)
- Density** : 0.8 g/cm3
- Water solubility** : Ethanol component is completely water miscible
- Viscosity, kinematic** : No data available

Percent Volatiles : 100 %

Conductivity (conductivity can be reduced by environmental factors such as a decrease in temperature) : Hydrocarbon liquids without static dissipater additive may have conductivity below 1 picoSiemens per meter (pS/m). The highest electro-static ignition risks are associated with "ultra-low conductivities" below 5 pS/m. See Section 7 for sources of information on defining safe loading and handling procedures for low conductivity products.

SECTION 10. STABILITY AND REACTIVITY

Conditions to avoid : Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources. Keep away from strong oxidizers.

Materials to avoid : Strong acids and oxidizing agents

Hazardous decomposition products : Carbon dioxide (CO₂), carbon monoxide (CO), oxides of nitrogen (NO_x), dense black smoke.

Thermal decomposition : No decomposition if stored and applied as directed.

Hazardous reactions : Hazardous polymerization does not occur. Note: Stable under recommended storage conditions.

SECTION 11. TOXICOLOGICAL INFORMATION

Carcinogenicity

NTP : Benzene (CAS-No.: 71-43-2)

IARC : Gasoline, natural; Low boiling point naphtha (CAS-No.: 8006-61-9)
Benzene (CAS-No.: 71-43-2)

OSHA : Benzene (CAS-No.: 71-43-2)

CA Prop 65 : WARNING! This product contains a chemical known to the State of California to cause cancer.
Benzene (CAS-No.: 71-43-2)

: WARNING! This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.
Toluene (CAS-No.: 108-88-3)
Benzene (CAS-No.: 71-43-2)

Skin irritation : Result: Mild skin irritation
Prolonged skin contact may cause skin irritation and/or dermatitis.

Eye irritation : Result: Mild eye irritation
The liquid splashed in the eyes may cause irritation and reversible damage.
Strong lachrymation can make it difficult to escape.

Further information : Liver and kidney injuries may occur.
Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
May cause irritation of respiratory tract.

Component:

Ethanol; Ethyl alcohol 64-17-5 Acute oral toxicity: LD50 rat
Dose: 6,200 mg/kg

Acute dermal toxicity: LD50 rabbit
Dose: 19,999 mg/kg

Acute inhalation toxicity: LC50 rat
Dose: 8,001 mg/l
Exposure time: 4 h

Skin irritation: Classification: Irritating to skin.
Result: Mild skin irritation
Prolonged skin contact may cause skin irritation and/or dermatitis.
Eye irritation: Classification: Irritating to eyes.
Result: Mild eye irritation
Mild eye irritation

Gasoline, natural; Low boiling point naphtha 8006-61-9

Acute oral toxicity: LD50 rat
Dose: 18.8 mg/kg

Acute inhalation toxicity: LC50 rat
Dose: 20.7 mg/l
Exposure time: 4 h

Skin irritation: Classification: Irritating to skin.
Result: Mild skin irritation

Eye irritation: Classification: Irritating to eyes.
Result: Moderate eye irritation

Pentane 109-66-0

Acute oral toxicity: LD50 rat
Dose: 2,001 mg/kg

Acute inhalation toxicity: LC50 rat
Dose: 364 mg/l
Exposure time: 4 h

Skin irritation: Repeated or prolonged exposure may cause skin irritation and dermatitis, due to degreasing properties of the product.

Eye irritation: Classification: Irritating to eyes.
Result: Mild eye irritation

Benzene 71-43-2

Acute oral toxicity: LD50 rat
Dose: 930 mg/kg

Acute inhalation toxicity: LC50 rat
Dose: 44 mg/l
Exposure time: 4 h

Skin irritation: Classification: Irritating to skin.
Result: Mild skin irritation

Repeated or prolonged exposure may cause skin irritation and dermatitis, due to degreasing properties of the product.

Eye irritation: Classification: Irritating to eyes.
Result: Risk of serious damage to eyes.

Toluene 108-88-3

Acute oral toxicity: LD50 rat
Dose: 636 mg/kg

Acute dermal toxicity: LD50 rabbit
Dose: 12,124 mg/kg

Acute inhalation toxicity: LC50 rat
Dose: 49 mg/l
Exposure time: 4 h

Skin irritation: Classification: Irritating to skin.
Result: Mild skin irritation

Prolonged skin contact may defat the skin and produce dermatitis.

Eye irritation: Classification: Irritating to eyes.
Result: Mild eye irritation

| | | |
|---------------|-----------|--|
| Xylene | 1330-20-7 | <p><u>Acute oral toxicity:</u> LD50 rat Dose: 2,840 mg/kg</p> <p><u>Acute dermal toxicity:</u> LD50 rabbit Dose: ca. 4,500 mg/kg</p> <p><u>Acute inhalation toxicity:</u> LC50 rat Dose: 6,350 mg/l Exposure time: 4 h</p> <p><u>Skin irritation:</u> Classification: Irritating to skin. Result: Mild skin irritation Repeated or prolonged exposure may cause skin irritation and dermatitis, due to degreasing properties of the product.</p> <p><u>Eye irritation:</u> Classification: Irritating to eyes. Result: Mild eye irritation</p> |
|---------------|-----------|--|

SECTION 12. ECOLOGICAL INFORMATION

Additional ecological information : Keep out of sewers, drainage areas, and waterways. Report spills and releases, as applicable, under Federal and State regulations.

Component:

| | | |
|-------------------------------|----------|--|
| Ethanol; Ethyl alcohol | 64-17-5 | <p><u>Toxicity to fish:</u> LC50 Species: Leuciscus idus (Golden orfe) Dose: 8,140 mg/l Exposure time: 48 h</p> <p><u>Acute and prolonged toxicity for aquatic invertebrates:</u> EC50 Species: Daphnia magna (Water flea) Dose: 9,268 - 14,221 mg/l Exposure time: 48 h</p> |
| Pentane | 109-66-0 | <p><u>Acute and prolonged toxicity for aquatic invertebrates:</u> EC50 Species: Daphnia magna (Water flea) Dose: 9.74 mg/l Exposure time: 48 h</p> |
| Toluene | 108-88-3 | <p><u>Toxicity to fish:</u> LC50 Species: Carassius auratus (goldfish) Dose: 13 mg/l Exposure time: 96 h</p> <p><u>Acute and prolonged toxicity for aquatic invertebrates:</u> EC50 Species: Daphnia magna (Water flea) Dose: 11.5 mg/l Exposure time: 48 h</p> <p><u>Toxicity to algae:</u> IC50 Species: Selenastrum capricornutum (green algae) Dose: 12 mg/l Exposure time: 72 h</p> |

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal : Dispose of container and unused contents in accordance with federal, state and local requirements.

SECTION 14. TRANSPORT INFORMATION**CFR**

Proper shipping name : ETHANOL
UN-No. : 1987
Class : 3
Packing group : II
Emergency Response : 127
Guidebook Number

TDG

Proper shipping name : ETHANOL
UN-No. : UN1987
Class : 3
Packing group : II
Emergency Response : 127
Guidebook Number

IATA Cargo Transport

UN UN-No. : UN1987
Description of the goods : ETHANOL
Class : 3
Packaging group : II
ICAO-Labels : 3
Packing instruction (cargo aircraft) : 307
Packing instruction (cargo aircraft) : Y305

IATA Passenger Transport

UN UN-No. : UN1987
Description of the goods : ETHANOL
Class : 3
Packaging group : II
ICAO-Labels : 3
Packing instruction (passenger aircraft) : 305
Packing instruction (passenger aircraft) : Y305

IMDG-Code

UN-No. : UN 1987
Description of the goods : ETHANOL
Class : 3
Packaging group : II
IMDG-Labels : 3
EmS Number : F-E S-D
Marine pollutant : No

SECTION 15. REGULATORY INFORMATION

OSHA Hazards : Flammable liquid
 Moderate skin irritant
 Moderate eye irritant
 Highly toxic by ingestion
 Carcinogen

TSCA Status : On TSCA Inventory

DSL Status : All components of this product are on the Canadian DSL list.

SARA 311/312 Hazards : Fire Hazard
 Acute Health Hazard
 Chronic Health Hazard

PENN RTK US. Pennsylvania Worker and Community Right-to-Know Law (34 Pa. Code Chap. 301-323)

| <u>Components</u> | <u>CAS-No.</u> |
|---|----------------|
| Benzene | 71-43-2 |
| Xylene | 1330-20-7 |
| Toluene | 108-88-3 |
| Gasoline, natural; Low boiling point naphtha | 8006-61-9 |
| Ethanol; Ethyl alcohol | 64-17-5 |

MASS RTK US. Massachusetts Commonwealth's Right-to-Know Law (Appendix A to 105 Code of Massachusetts Regulations Section 670.000)

| <u>Components</u> | <u>CAS-No.</u> |
|---|----------------|
| Benzene | 71-43-2 |
| Xylene | 1330-20-7 |
| Toluene | 108-88-3 |
| Gasoline, natural; Low boiling point naphtha | 8006-61-9 |
| Ethanol; Ethyl alcohol | 64-17-5 |

NJ RTK US. New Jersey Worker and Community Right-to-Know Act (New Jersey Statute Annotated Section 34:5A-5)

| <u>Components</u> | <u>CAS-No.</u> |
|---|----------------|
| Benzene | 71-43-2 |
| Xylene | 1330-20-7 |
| Toluene | 108-88-3 |
| Gasoline, natural; Low boiling point naphtha | 8006-61-9 |
| Ethanol; Ethyl alcohol | 64-17-5 |

SARA III US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 313 Toxic Chemicals (40 CFR 372.65) - Supplier Notification Required

| <u>Components</u> | <u>CAS-No.</u> |
|-------------------|----------------|
| Toluene | 108-88-3 |
| Xylene | 1330-20-7 |
| Benzene | 71-43-2 |

California Prop. 65 : WARNING! This product contains a chemical known to the State of California to cause cancer.

Benzene 71-43-2

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

Toluene 108-88-3

Benzene 71-43-2

SECTION 16. OTHER INFORMATION

Further information

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Prepared by : GWU mbH
Birlenbacher Str. 18
D-57078 Siegen

Germany
Telephone: +49-(0)271-88072-0

Revision Date : 11/04/2008