



Ethanol and Gasoline Fuel Blend Releases

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The Missouri Department of Natural Resources and the Missouri Department of Public Safety, Division of Fire Safety have designed the following fact sheet to provide guidance to fire departments and emergency response personnel that may respond to releases involving ethanol and gasoline fuel blends. Rapidly rising gasoline prices and energy dependence have led to an increased interest in alternative fuels such as ethanol and gasoline fuel mixtures. The acceptance of the ethanol and gasoline fuel blend concept is expected to increase the number of ethanol plants in the Midwest. The increase in ethanol plants will naturally increase the transportation of gasoline fuel blends in Missouri and throughout the Midwest.

What is ethanol?

Ethanol is also known as ethyl alcohol or grain alcohol. Like gasoline, ethanol contains hydrogen and carbon, but ethanol also contains oxygen in its chemical structure. The addition of oxygen makes for a cleaner burning fuel than gasoline.

What is an ethanol/gasoline fuel blend?

In the United States ethanol is primarily produced from corn. Ethanol is denatured at the ethanol plant to prevent ingestion. The denaturing agent most often used is some type of hydrocarbon such as gasoline. Denatured ethanol may contain 2 to 15 percent gasoline, making it an ethanol and gasoline fuel blend. For example, E85 contains 85 percent ethanol and 15 percent gasoline. Other blends may include E10, which contains 10 percent ethanol and 90 percent gasoline, and E15, which contains 15 percent ethanol and 85 percent gasoline. Spills and fires involving ethanol and gasoline blends should be treated differently than traditional gasoline spills and fires.

Properties of Ethanol and Ethanol/Gasoline Fuel Mixtures

Property	Comment
Vapor density	Ethanol vapor, like gasoline vapor, is more dense than air and tends to settle in low areas. However, ethanol vapor disperses rapidly.
Solubility in water	Fuel ethanol will mix with water, but at high enough concentrations of water, the ethanol will separate from the gasoline.
Flame visibility	An ethanol/gasoline fuel blend flame is less bright than a gasoline flame but is visible in daylight.
Specific gravity	Pure ethanol and ethanol/gasoline blends are heavier than gasoline.
Conductivity	Ethanol and ethanol blends conduct electricity. Gasoline, by contrast, is an electrical insulator.
Toxicity	Ethanol is less toxic than gasoline or methanol. Carcinogenic compounds are not present in pure ethanol; however, because gasoline is used in the blend, E85 is considered potentially carcinogenic.
Flammability	Flashpoint for gasoline=-45° F, Flashpoint for pure ethanol= 55° F, Flashpoint for E85= -20 to -4° F, Considerations: pure ethanol(UEL=19% LEL=3.3%) and E85 (UEL=19% LEL=1.4%) have a wider range of flammability than gasoline (UEL=7.7% LEL=1.4%) and gasoline has a lower flash point

Potential Fire Fighting Hazards

Fires involving E85 and other ethanol/gasoline blends mix readily with water and will degrade the effectiveness of fire fighting foam, which is not alcohol-resistant. Because of this, the following fire fighting measures should be considered when responding to ethanol and gasoline blend incidents.

According to the North American Emergency Response Guidebook 2004, responders should:

- Call the emergency response telephone number on shipping paper first.
- As an immediate precautionary measure, isolate spill or leak area for at least 150 feet in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate closed spaces before entering.
- Wear positive pressure self-contained breathing apparatus, also known as SCBA.
- Structural firefighters protective clothing will only provide limited protection.

For fires, responders should:

Be cautioned that these products have a very low flash point. Use of water spray, when fighting fire may be inefficient.

- For small fires, use dry chemical, CO₂, water spray or alcohol-resistant foam.
- For large fires:
 - Use water spray, fog or alcohol-resistant foam.
 - Use water spray or fog; do not use straight streams.
 - Move containers from fire area if you can do it without risk.
- For fire involving tanks or car/trailer loads:
 - Fight fire from the maximum distance or use unmanned hose holders or monitor nozzles.
 - Cool containers with flooding quantities of water until well after fire is out.
 - Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
 - Always stay away from tanks engulfed in fire.
 - For massive fire, use unmanned hose holders or monitor nozzles. If this is not possible, withdraw from area and let the fire burn.

Spill or Leak Prevention

According to the North American Emergency Response Guidebook 2004, responders should:

- Eliminate all ignition sources (no smoking, flares, sparks or flames in the immediate area).
- All equipment used when handling the product must be grounded.
- Do not touch or walk through spilled material.
- Stop the leak if you can do it without risk.
- Prevent entry in waterways, sewer, basements or confined areas.
- A vapor suppressing foam may be used to reduce vapors.
- Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- Use clean non-sparking tools to collect absorbed material.

Additional Guidance

- If possible, the spill of fuel should be contained and the release stopped.
- Pump, recover and containerize as much free product as possible.
- Apply sand, straw, sawdust, ground corn cobs, or commercial absorbents such as kitty litter or oil dry to absorb petroleum residues rather than wash them away with water.
- Absorbent materials used to clean up fuel spills may be disposed of at a sanitary landfill with prior approval of the landfill operator.
- Keep in mind, all equipment used when handling this product must be grounded
- Every response method has its own inherent advantages and disadvantages. Specific response must be evaluated and initiated on a case-by-case basis.

Spill Reporting Requirements

If a release of ethanol/gasoline blend occurs, the department urges the responding agency and responsible party to notify the department's 24-hour spill line as soon as possible at (573) 634-2436. Under the Oil Pollution Act ethanol fuel mixtures are considered a petroleum product. Thus, any amount of petroleum threatening a waterway or creating a sheen on a waterway is reportable. In accordance with sections 260.500 through 260.550, Revised Statutes of Missouri, commonly referred to as the "Spill Bill", any release of petroleum in excess of 50 gallons is reportable.

Placarding/Department of Transportation Reference

At present, blends containing ethanol and gasoline may be placarded in one of the following ways:

Alcohols, n.o.s., 3, UN1987 - Special Provision 172 allows alcohol blends containing up to 5 percent gasoline under this description.

Denatured alcohol, 3 NA1987 - Special Provision 172 allows blends containing up to 5 percent gasoline under this description.

Flammable liquid, n.o.s. (ethanol gasoline), 3, UN1993 - May include varying concentrations of ethanol/gasoline.

Gasoline, 3, NA1203 - Authorized for gasoline mixed with not more than 20 percent ethanol – for U.S. shipment only.

3, NA3475 (mandatory in 2010, voluntary compliance is permitted immediately) - Ethanol and gasoline mixtures, ethanol and motor spirit, and ethanol and petrol mixtures with more than 10 percent ethanol.

The placard should look like the following with one of the above UN and NA numbers inserted.



For more information

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