Preventing and Controlling

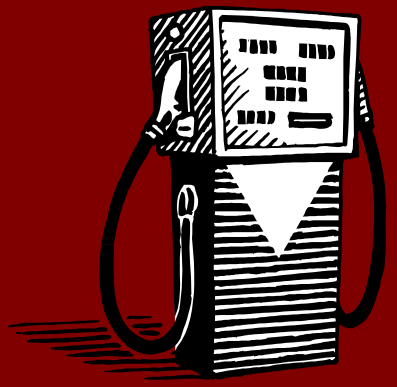
Ethanol Fires

Ethanol Fires

- Alternative fuel, new focus on danger
- Gasoline fires vs. Ethanol fires
- *Solubility in water / Specific gravity*
- *Conductivity / Vapor density / Toxicity*
- Fires, public safety
- Spills / Small fires / Big fires

New Focus on Danger

- **E85 is highly flammable, and will be easily ignited by heat, sparks or flames.**
- E85 is a polar/water-miscible flammable (i.e., they mix readily with water)
- *Flame visibility:* A fuel ethanol flame is less bright than a gasoline flame but is easily visible in daylight.



Gasoline fires vs. Ethanol fires

- Foam is used to blanket the top of burning gasoline and usually snuffs out of the flames.
- Ethanol fires require a special alcohol-resistant foam that relies on long-chain molecules known as polymers to smother the flames.

Solubility in water / Specific gravity

- *Solubility in water:* Fuel ethanol will mix with water, but at high enough concentrations of water, the ethanol will separate from the gasoline.
- *Specific gravity:* Pure ethanol and ethanol blends are heavier than gasoline.

Conductivity

- *Conductivity:* Ethanol and ethanol blends conduct electricity. Gasoline, by contrast, is an electrical insulator.

Vapor Density / Toxicity

- *Vapor density:* Ethanol vapor, like gasoline vapor, is denser than air and tends to settle in low areas. However, **ethanol vapor disperses rapidly**.

- *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 to be potentially carcinogenic.

Good News about Ethanol

- *Flammability:* At low temperature (32°), E85 vapor is more flammable than gasoline vapor. However at normal temperatures, E85 vapor is less flammable than gasoline.

Spills

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Use clean non-sparking tools to collect absorbed material.

Fires, public safety

- Call 911 immediately
- Keep unauthorized personnel away
- Stay upwind
- Keep out of low areas
- Structural firefighters' protective clothing will only provide limited protection

Extinguishing Small Ethanol Fires

- Use a CO2, halon, or dry chemical extinguisher that is marked B, C, BC, or ABC.
- An alcohol-type or alcohol-resistant (ARF) foam may be used to effectively combat fuel ethanol fires.
- **Never use water** to control a fire involving high-concentration fuel ethanol such as E85

Firefighters will:

- Fight fire from maximum distance
- 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