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