



Module 2: Ethanol and Ethanol-Blended Fuels

Objective



Upon completion of this module, participants should be able to describe the use of ethanol & ethanol-blended fuels in the United States.



Introduction



May 14, 2007:

- Cargo tank truck overturned & burned
- 8,000 gallons released
- Driver killed
- Sent burning stream of ethanol onto the road below



Baltimore, MD

Introduction



October 20, 2006:

- Train carrying 86 rail tank cars of denatured fuel ethanol
- Train derailed while crossing the Beaver River railroad bridge
- Rail tank cars ignited & caught on fire
- Some of the unburned denatured fuel ethanol was released into the river & the surrounding soil



New Brighton, PA

Introduction



- Primary automotive fuels are gasoline & diesel
- U.S. automobile industry predominantly produced gasoline-powered vehicles
- Gasoline & diesel are hydrocarbons derived from crude oil



Introduction



- Ethanol-blended fuels are a substantial component of U.S. motor fuel market:
 - Ethanol blended into nearly all unleaded gasoline
 - Available throughout the U.S. & in all octane grades of gasoline
- Bio-refineries, ethanol production facilities, exist in multiple states
- Expected increase in transportation needs to bring product to market



History of Ethanol-Blended Fuels



- Ethanol was used to power original Model-T Ford!
- Ethanol has been a gasoline additive since the 1980s
- Primary role was air quality improvement
 - Replace lead, MTBE & other harmful chemicals
- Secondary role was octane improvement
- Current role is octane, air quality, & increase domestic energy production



History of Ethanol-Blended Fuels



In 2010s:

- EPA approval is up to 15% by volume ethanol (E15) allowed in gasoline
- Ethanol flex fuels becoming more available

ATTENTION

E15

Up to 15% ethanol

Use only in

- 2001 and newer passenger vehicles
- Flex-fuel vehicles

Don't use in other vehicles, boats or gasoline-powered equipment. It may cause damage and is **prohibited** by Federal law.



Common Ethanol Blends & Ethanol-Blended Fuels



Common Name	Ethanol Concentration	Acronyms/ Synonyms
Ethanol	100% Volume	Ethyl Alcohol, Distilled Spirits, Beverage Alcohol, Neat
Denatured Fuel Ethanol	95-98% Volume	E95-E98, Fuel Alcohol
E85*	51-85% Volume	Ethanol Flex-Fuel, E85
E15*	15% Volume	E15, Unleaded Gasoline
E10*	10% Volume	E10, Unleaded Gasoline

* “EXX” is commonly used to indicate the ethanol concentration in volume %.

Summary



- Ethanol has been a gasoline additive since the 1980s
- Ethanol use has expanded dramatically in the U.S. since the mid-2000s
- Ethanol production & use continues to increase
- Expected increase in transportation needs to bring product to market