

# Ethanol Fuel Storage Advisory

## March 30<sup>th</sup>, 2009

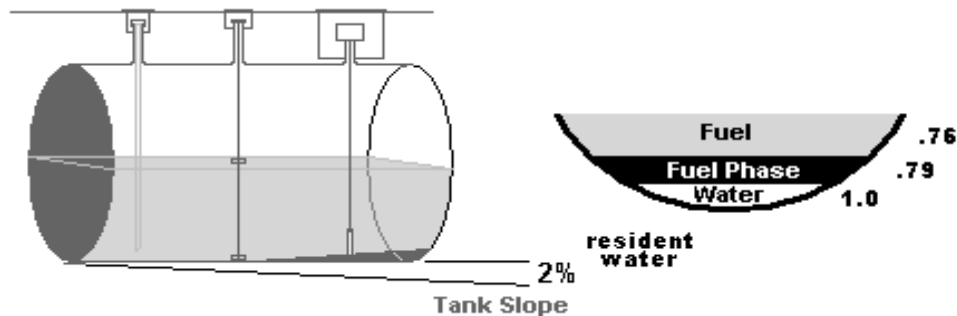
Revision update 03-07-2009

**E-10, E-15, E-20, E-85 Ethanol Introduction - North Carolina, South Carolina, Florida, Louisiana, Tennessee, Georgia and Alabama**  
**January, 2009 through December, 2009**

### **Resident Water and Chemical Constitute Complication E-10 E-85 Issues**

- Some fuel marketers have scheduled the introduction of E-10 ethanol blended fuel in the southern and central states. The expected or anticipated introduction dates were September 30<sup>th</sup>, 2007 through December 31st, 2008. The transition typically will affect all retail, commercial and municipal gasoline fueling sites throughout these and surrounding states. The rack logistics and rack transition dates have been defined. The arrival of blended ethanol E-10 fuel in all of these areas is likely and inevitable.
- **It is expected that major oil companies will begin to market their own brand blends of E-85 and mid level ethanol blends for flex fuel designated vehicles and E-20 Tier II ethanol blend enhanced fuel for capable use vehicles manufactured after 1997 by January, 2010.**
- Marketers of fuels should expect the introduction of E-10 ethanol blended fuels to affect by degree the quality of fuel stored and delivered to their customers.
- Marketers should realize that some concerns and precautions should be observed and taken when making any new fuel marketing transition. Most branded refiners have established simple and recommended site preparation protocols and procedures to be followed when making the transition to ethanol-blended fuel.
- In most tanks the simplest precaution step to follow is the removal (bottom sweep) of resident (naturally and unnaturally occurring) water that might be present in the tank scheduled for ethanol blend fuel introduction. Water present when ethanol blended fuels are introduced will cause a fuel water/ethanol phase, affecting customer vehicle drivability and the marketable quality of fuel being stored and delivered.
- In some tanks a complicating issue is tank wall attached resident sodium salts. Sodium present when ethanol blended fuel is introduced will cause a sodium/ethanol phase affecting delivery equipment (pumps, dispenser control valves, meters and blend meter check valves), customer vehicle drivability or performance and the marketability of fuel being stored.
- Retail and commercial marketers of fuel should be aware that most above and below ground fuel storage tanks inherently contain some amount of condensed atmospheric moisture in the form of water. Depending on the quality of fuel received from the refinery attached sodium salt can be expected by degree as well.
- Tanks through loose or broken tank top fittings will accumulate water. Ethanol being Hydroscopic, it WILL absorb water and sodium salts producing tank bottom fuel phase separations.
- Accumulated ethanol water and sodium phase separations often will not be recognized by electronic tank monitoring equipment, dispenser monitoring filters or reformulated ethanol fuel water finding paste.
- During any regional transition to ethanol-blended fuel, some degree of phase contamination delivered to a fueling site can and should be expected.

The degree of phase contamination depends on the volume of water present when ethanol blend fuel is introduced. An excessive or unknown tank horizontal tilt may not allow for the degree or amount of water naturally or unnaturally occurring in the tank to be monitored, recognized or its removable volume to be calculated.



- Small amounts of resident water may not affect the quality of fuel introduced. Larger amounts of water can have a catastrophic or fatal effect on fuel quality.
- It is strongly advised that all tanks be surveyed and the tanks exact slope and the waste volume requiring removal determined. All resident naturally and unnaturally occurring water must be removed before the introduction and storage of ethanol blended fuel.
- The most effective procedure for removing high water/ethanol phase from fuel storage tanks if severe has been found to be ◁ “Low Temperature Fuel Circulation” to accelerate water fuel freeze phase fall out.
- The effect and inconveniences of ethanol/water/sodium phasing at retail fueling sites getting to fueled customer vehicle are obvious. Commercial marketers of fuel, particularly municipal fleet managers (police, rescue and fire departments) should be aware that emergency equipment performance and operation can and will be effected with the introduction of ethanol blended fuels into tanks containing water. Fuel purchasing management at the municipal level should ask suppliers for ◁ critical notification before ethanol blended fuels are scheduled for delivery.

The following information helpful in determining ethanol fuel storage tank preparations is available upon request at this address. “zmillier@orvr.us”

- ◁ 2007 *National Standards Process and Procedures for storage tank ethanol blend fuel introduction” Field Service Guide”.*
- ◁ 2005/6 *North East United States E-10 post ethanol blend introduction report.*
- ◁ 2007 *South East United States E-10 post ethanol blend introduction report.*
- ◁ 2008 *South East United States E-10 post ethanol blend introduction Florida.*
- ◁ 2007 *Fueling site typically reported system component failures post E-10 introduction.*
- ◁ 2007 *Post inspection percentage of tank typically requiring preparation.*
- ◁ 2007 *Resident tank waste percentages United States regionally.*
- ◁ 2008 *Ethanol tank preparation and condition report forms.*
- ◁ 2008 *Municipal Critical ethanol blend fuel delivery notification and advisory.*
- ◁ 2009 *Accelerated temperature fuel/water phase removal procedure*

Zane Miller  
 Testing LLC  
 Atlanta, Georgia 770-963-7200 offices 770-780-2700 cell zmillier@orvr.us