



Storage concerns with newer motor vehicle fuels



By Wayne Geyer, STI/SPFA Executive Vice President

In the past decade, clean air concerns have resulted in numerous changes to today's motor vehicle fuels. In our role supporting the storage tank industry, I'm involved with conferences, committees, and organizations where we have both the opportunity to present our own perspectives and learn from industry speakers.

This article presents some of my own observations about newer fuels and the challenges encountered in their storage.

[Read complete article...](#)

PEI revises RP 900, UST Inspection and Maintenance



For the past year, the Petroleum Equipment Institute (PEI) has been revising its RP 900 Standard for UST Inspection and Maintenance. RP 900's last revision was in 2008.

In the revision, PEI is responding to current concerns about water in underground tanks by adding an appendix regarding water removal. Also, PEI wants to make sure RP 900 reflects the EPA's new UST rules, published in late 2015.

PEI anticipates publication of the [revised RP 900](#) in April this year.

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ACT 100 tank in great shape after 23 years underground

Last fall, an STI member's tank was pulled from the site in Berwyn, Illinois, where it had been installed 23 years ago.

As the photo shows, the 12,000 gallon tank was in excellent condition, with the fiberglass coating intact.

The STI ACT-100 tank features a strong steel tank for structural integrity and a 100-mil fiberglass outer coating for long-lasting corrosion protection.



The tank was in excellent condition, with the fiberglass coating intact.

[See STI's tank designs here...](#)

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Missouri asks owners of older FRP tanks to line or replace

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WORLD'S BIGGEST SIX-PACK!



[Click the pic for more info.](#)

The City Brewery in Wisconsin has the [largest six-pack in the world](#). These steel storage tanks hold a total of 22,220 gallons of LaCrosse brand beer. That's 7,340,796 cans, enough to provide you a six-pack a day for 3,351 years. And a hefty hangover!

The World's Largest Six-Pack had been painted over since the G.



Card Eighmey, Executive Director of the Missouri Petroleum Storage Tank Insurance Fund (PSTIF) says that "Fiberglass-reinforced plastic (FRP) tanks made before 1981 are not warranted to be compatible with ethanol, according to manufacturers."

Controversy continues about the best tank material for storing ethanol blends, particularly for older tanks.

Cracking, blistering, and dissolution in FRP tanks has been occurring. The 2013 study "[Compatibility of UST Systems with Biofuels](#)", by the Alternative Fuels Workgroup of the Association of State and Territorial Solid Waste Management Officials (ASTSWMO), concluded that "Ensuring UST systems are made of or lined with materials that are compatible with the biofuels stored can reduce the risk of releases due to material incompatibility."

"Given that nearly all gasoline sold in Missouri now contains at least some ethanol," Eighmey said, "we're contacting owners of FRP tanks made before 1981 and asking them to either line them or replace them" to ensure these older FRP tanks don't leak.

See this [Manufacturer's Compatibility Chart](#) of tanks storing ethanol blends, from the US Department of Energy.

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Mid-level blends showing benefits, says ORNL*

"Oak Ridge National Laboratory has published a study on mid-level ethanol blends that has determined high-octane fuels (HOF), specifically ethanol blends of E25 to E40, could offer significant benefits to the U.S., including improved vehicle fuel efficiency in vehicles designed to use increased octane," according to an article published in *Ethanol Producer* magazine.

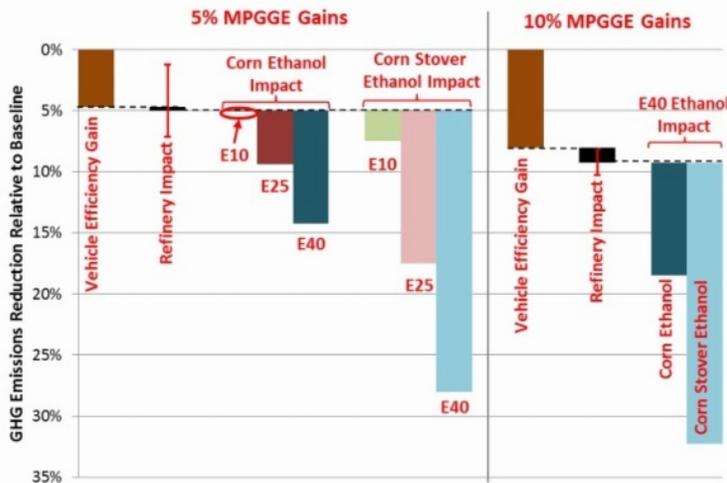


Figure 8. WTW GHG emissions reductions in vehicles fueled by HOFs with different ethanol blending levels relative to regular gasoline (E10) baseline vehicles.

Graph courtesy Oak Ridge National Laboratory
[Read more about the ORNL study](#)

Elsewhere on the mid-level blend ethanol fuels front

"Repeat After Me: High Octane, Low Carbon" writes Dave VanderGriend, president of the Urban Air Initiative, in another *Ethanol Producer* article. "Studies by Ford and others have determined that E30 high octane fuel would allow increased fuel efficiency and reduced tailpipe carbon emissions by 7% each," he notes. "This is an immediately available and easily adopted technology requiring little...change in consumer driving and fueling habits..."

[Read Dave VanderGriend's article](#)

[Read "Value of E30 proven in real time" article](#)

Corn-derived isobutanol: high octane, no moisture

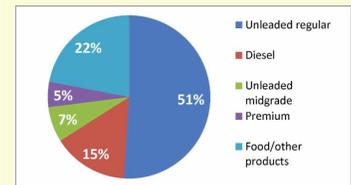
The *Havasu News* reported last October that a local station was offering isobutanol fuel to its boat and off-road-vehicle customers, the first retailer in the nation to do so.

Heileman Brewing Company, original proprietors, went out of business. But the facility has reopened as the City Brewery, which was the original name when it first opened in 1858.

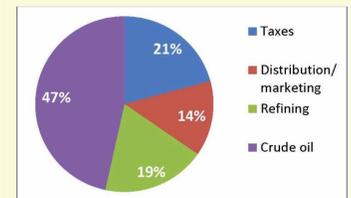
Rather than painting the tanks, the new owners have covered the three of them that face the street with vinyls. You can see the other three welded-plate tanks behind them.

Originally built in the late 1960's, the World's Largest Six-Pack is yet another demonstration of the longevity and durability of steel tanks.

Overview of US fueling market



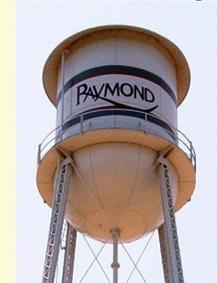
Gas station income sources.
[Click to view.](#)



What you pay for per gallon.
[Click to view.](#)

Data as of May 2016:
[PetrolPlaza.com](#)

Steel for Long Life: STI/SPFA's Century Club



Raymond, MS tank, 100 years old in 2005

STI/SPFA's Century Club

includes steel water tanks still in active service after 100 years (at the time of entering the Club).

Water tanks are some of the most identifiable structures across the United States, and we feel it is important to honor these tanks not only for their extraordinary service life, but also for the role they play in ensuring the safety of our water supplies.

And the age and usefulness of

Isobutanol is 91 octane, equivalent to super unleaded gasoline. Importantly, "it doesn't absorb moisture or create excess pressure, which can lead to long term engine damage," the report says. It has long been the contention of the small engine industry that ethanol damages their products.

[Read Havasu News article](#)

these Century Club tanks demonstrates that when properly maintained, steel tanks have a very long life.

STI/SPFA's Shop Fabricated Tank resources

- Petroleum Storage Tank Maintenance webinar
- About ASTs and USTs
- Codes and regulations
- Steel and alternative fuels
- STI's tank technologies



**NOTE* In a press release on November 23, 2016, the EPA's Renewable Fuel Standard (RFS) volumes for this year were announced. The EPA raised the total amount of biofuels required for blending into gasoline and diesel from 18.1 billion gallons in 2016 to 19.28 billion gallons (15 billion gallons of corn ethanol). This results in a 10.7 per cent ethanol blend.*

As of February 9, President Trump is "taking steps to eliminate the Environmental Protection Agency", according to a presidential aide [quoted in The Guardian](#) online. Even if this does not occur, the Trump administration could reopen the car fuel efficiency standards, according to the article.

In the meantime, however, mid-level ethanol blends continue to be explored for their ability to meet demand for high octane/low carbon fuels.

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Study: Gasoline contamination reduces diesel flash point



A 2015 study by the Georgia State Fuel Oil Laboratory monitored the flash point temperature of diesel fuel as it left the refinery, was transported through the infrastructure, and loaded into a service station tank. Oil chemist David Au, director of the laboratory, discovered that the flash point temperature of diesel dropped significantly during truck delivery to the UST.

The "flashpoint" is the temperature at which a fluid generates enough vapor to ignite ("flash"). Lower flashpoints are a higher fire risk.

Dual compartment "split loading" delivery trucks use a common vent, so the more volatile liquid in one compartment (gasoline and ethanol) releases vapors that move into the diesel compartment, reducing the diesel flash point. As little as 1% gasoline or 2% ethanol drops the diesel flash point 40 degrees F.

Diesel is defined to have a flash point over 125 degrees F (ASTM D975). In this study, the diesel left the refinery at 143 F, but by the time it was delivered into the UST, it was under 110 degrees F. If the flash point approaches that of gasoline or ethanol, it becomes a much more hazardous liquid. The Fire Codes treat Class I flammable (gas and ethanol) liquids much more cautiously than Class II diesel liquids.

The Georgia State Fuel Oil study found that, in 2015, the phenomenon affected more than 200 service stations, while in 2013, only two years earlier, fewer than 70 were affected. Clearly, this drop in flash point temperature as diesel is delivered is a growing safety concern.

For more information, contact [David Au](#), Director, Georgia State Fuel Oil Laboratory, 229-386-3486.

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Flameshield tank endures 24-36 hour fire



Fireguard tank (left) at fire site

Industry Calendar of Meetings, Conferences and Events

[Click here](#)

STI/SPFA Education and Certification Programs

Click links for information and registration

Cathodic Protection Certification Course

March 29-30, Edison NJ
April 19-20, Kansas City MO
October 25-26, Columbia SC

SP001 AST Inspection Training and Certification Course

March 6-10 Baltimore MD
June 12-16 Baltimore MD
August 21-25 Baltimore MD
September 25-29 Houston
December 4-8 Baltimore MD

Field Erected Water Storage Tank Seminars

2017 Dates TBA

Online Certificate Tank Integrity Management Certificate

Recorded Webinars

- Steel Pipe Flange Installation
- Petroleum Storage Tank Maintenance



*Flameshield label still visible
after 24-36 hour site fire*

An STI Flameshield tank endured long hours of fire at its site without serious damage, according to an STI member fabricator's customer.

The incident took place in Oklahoma last spring. A salt water disposal (fracking waste water) tank was struck by lightning. The subsequent site fire lasted 24-36 hours before burn-out, including a Flameshield tank in close proximity.

"We'd topped off the 4,000 (Flameshield) tank at 4 pm on the day of the fire," said the customer. "Three days later, we sucked 3,750 gallons from the tank." Clearly, the tank endured the site fire without significant damage or leakage.

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NREL: Water uptake of blends in humid environments



At the request of the Renewable Fuels Association (RFA), the National Renewable Energy Laboratory (NREL), investigated water uptake by ethanol blends in humid environments.

The impetus for the 2016 study came from owners of "non-road equipment" (e.g. watercraft, ATVs, snowmobiles, lawn/garden equipment), which is often used seasonally and then subject to long periods of storage. The concern is that E10 blended gasoline, now the most prevalent motor vehicle fuel by a large percentage, may potentially take up water from humid air, leading to phase separation.

NREL's results seem to indicate that phase separation in idle non-road equipment is not a concern:

"Ethanol blends can hold more water without phase separation than hydrocarbon, and more ethanol improves their resistance to phase separation. This is an advantage that can help keep fuel systems "dry" by moving low levels of water out of the system..."

"In a small engine fuel tank in a constantly high-temperature, high-humidity environment, it takes three months or longer for E10 and other ethanol blends to take up enough water for phase separation..."

"Significant gasoline weathering (evaporation of the most volatile components) can occur over one month of storage in a high-temperature, high-humidity environment, with total mass losses as high as 30-70% for certain tanks. This means gasoline weathering, which can have a negative effect on fuel quality, generally occurs well in advance of any issues related to phase separation..."

[Read NREL's complete report...](#)

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ASTSWMO: UST Common Compliance Violations Report



The Association of State and Territorial Solid Waste Management Officials' (ASTSWMO) UST Task Force has completed its analysis of FY 2014 UST data and is releasing the *UST Common Compliance Violations Report - FY 2014*. These data are analyzed and reported biennially.

The ASTSWMO UST Task Force developed this biennial report to serve as a resource to better understand the types of violations issued by UST programs. ASTSWMO solicited information from all 50 States, five Territories and the District of Columbia in an

- [Steel Water Pipe Fittings and Design](#)
- [Regulation of Tanks Inside Buildings: A Guide for Code Users and Enforcers](#)
- [Tank Venting Essentials: PreVENTing Catastrophe](#)

E-Learning Modules

- [Steel Water Pipe Overview](#)
- [Steel Water Pipe Coatings and Linings](#)
- [Steel Water Tank Standards](#)
- [Steel Water Tank Construction](#)
- [Steel Water Tank Coatings and Linings](#)



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effort to determine which violations were most often encountered during UST compliance inspections and other verification activities. The report builds on similar studies conducted for 2010 and 2012.

STI notes the following of particular interest:

- The new requirements for operator training have become the #1 focus for state regulatory bodies in assessing owner/operator compliance.
- Release detection has become the highest equipment functionality/operations non-compliance issue.
- Corrosion is no longer a primary concern (despite current industry focus on ULSD corrosion).

The FY 2014 dataset represents the responses of 31 states and one local agency, and accounts for nearly 43,000 UST inspections. Here are the top six violations:

1. Operator training: 81% of States reporting it in their top eight violations
2. Release detection-pressure piping: 75%
3. Release detection-tank: 69%
4. Spill prevention: 63%
5. Corrosion protection: 59%
6. Financial responsibility: 53%

[Click here for the complete report](#)

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Maintaining diesel fuel quality in backup generators



This STI GenBase tank is the type that fuels backup generators.

A recent article in *Government Fleet* magazine emphasizes the importance of tank maintenance, given the problems with storing ULSD.

With the reduction in sulfur mandated by the EPA in 2007 came a reported increase in microbial activity--fungus, mold, and bacteria--in diesel storage tanks. Maintenance now includes use of biocides to maintain fuel quality.

Diesel fuel instability is also a consideration. During Hurricane Charlie in Florida in 2004, 50% of standby generators were reported (by FEMA) to have failed. Since this was before widespread storage of ULSD, it was determined that old fuel and its breakdown products were the likely cause.

[Read the Government Fleet article here](#)

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California's Low Carbon Fuel Standard



California's Low Carbon Fuel Standard (LCFS) promotes the use of transportation fuels that reduce greenhouse gases. The LCFS was issued in 2007 and the California Air Resources Board (ARB) has issued regulations and amendments ever since.

Since there were some procedural issues related to initial adoption, ARB re-adopted the LCFS regulation in 2015, with an effective date of January 1, 2016.

The LCFS utilizes a market-based credit trading system to allow fuel providers to choose how they reduce emissions, while responding to consumer demand. The Pacific Coast Collective, a regional agreement between California, Oregon, and British Columbia, strategically aligns greenhouse gas reduction policies.

[Read more about California ARB's LCFS](#)

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Maps show "anatomy" of nation's infrastructure

A fascinating article appeared on the *Washington Post's* website last December. In a series of six maps, it shows the "anatomy" of the nation's infrastructure, and examines its future in light of then-presidential candidate Donald Trump's massive infrastructure

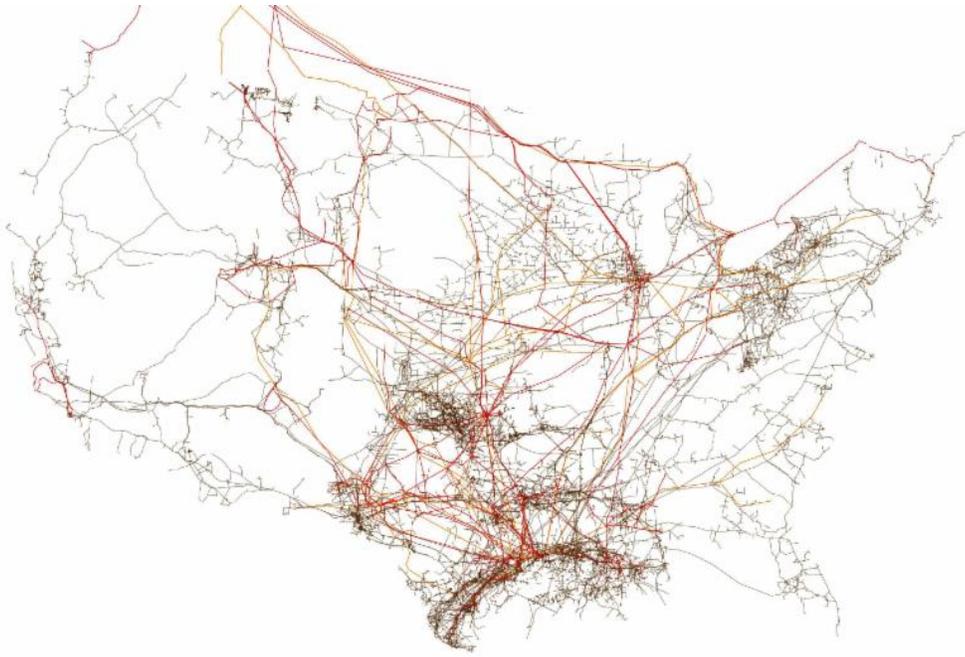
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proposal.

The maps include electrical grid, railroads, airports, waterways, and bridges. For the steel fabrication industry, perhaps the most relevant is this pipelines map:



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[See full article and all six maps here...](#)