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Steel: Bury at any depth



Steel's strength and versatility are well known. Steel tanks can be manufactured in any size, any configuration, as a single wall, double wall or even a triple wall tank.

One of the unique attributes of a steel underground tank is that it can be manufactured to be buried at any depth. The maximum burial depth increases or decreases simply by changing the attributes of the tank, such as diameter, length, steel thickness, double wall, internal compartments, etc.

To determine the proper thickness of steel for a particular tank, STI's licensed tank designs specify use of the proven Roark engineering formula. It was chosen based on innovative, extensive research conducted by STI in cooperation with Underwriters Laboratories. Testing was conducted on full size tanks by Dr. Allan Reese, who presented and published a paper on this topic at ASME. (Available in the STI-SPFA online Store, item #700-50-7003, [Experimental Investigation of Buckling in Full-Size Steel Underground Storage Tanks.](#))

The Roark Formula

The steel thickness required for a particular tank depth is derived by equating the buckling pressure to the external pressure at the bottom of the tank when submerged in water with no backfill support. This ensures that even under worst case conditions, with no support from the surrounding backfill, the steel tank will not deform.

The calculated steel thickness is a function of both the tank dimensions and the tank burial depth. The Roark formula assures that the appropriate steel thickness specific to each tank design is used. Thus, there is no "one size fits all" calculation for buried underground tanks. Each design specifies steel thickness appropriate to the burial depth.

When purchasing underground storage tanks, owners/operators should be sure the design is appropriate for the anticipated burial depth.

Lightning and tank fires



The Salina (Kansas) Journal reported that a lightning strike was the cause of an August 11 oil storage tank fire just to the east of the town. The top of the tank went "soaring" said the local fire chief, and flames shot 40 feet into the air from the 5,000 gallon oil tank.

Both the fiberglass reinforced plastic (FRP) oil storage tank and a larger salt water brine tank nearby melted in the fire, spilling their contents into the retention pit surrounding the tanks.

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Stop by and say hello at exhibit #4472 at PEI!



Are you going to the **PEI convention** October 18-21 in Atlanta? Be sure to stop by the STI-SPFA exhibit--we'd love to see you!

What's in a barrel?

- 18.9 gallons gasoline
- 12.4 gallons diesel/home heating oil
- 4.0 gallons kerosene-type jet fuel
- 2.3 gallons coke
- 1.9 gallons SRF gas
- 1.9 gallons liquid refinery gases
- 1.2 gallons heavy residual fuel oils
- 0.8 gallon asphalt and road oil
- 0.6 gallon petrochemical feedstocks
- 0.4 GALLON LUBRICANTS
- 0.7 gallon other



[Here's an interesting chart](#) from the Department of Energy, showing what products are derived from a barrel of crude oil.

Tank rises to surface

In another incident, on August 26, lightning sparked three tank battery fires in west Texas. According to local ABC affiliate KTRE, one of the fires caused a chemical reaction within the bottom portion of the tank and led to a booming explosion heard miles away. "Usually, [fire-caused explosions] blow the tops off of them," the local volunteer fire chief said. "This one failed on the bottom, which made that tank take off like a 'hydro-rocket.'"

Steel tanks safer

What the west Texas tanks were made of is not clear, but of the Salina tank meltdown, Wayne Geyer, executive vice president of the Steel Tank Institute commented that, "If the tanks (in Salina) had been steel, the meltdown would not have happened. Correctly installed steel tanks conduct the lightning's electrical surge harmlessly into the ground."

[See KTRE's video](#)

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EPA finalizes tougher US truck emission standards to reduce GreenHouse Gases (GHG) and increase fuel efficiency (FE)



EPA video: Greenhouse Gas Emissions Standards for Heavy Duty Vehicles

On August 16, the U.S. Environmental Protection Agency and National Highway Traffic Safety Administration finalized the latest round of more-stringent greenhouse gas and fuel efficiency (GHG/FE) standards for new large and heavy-duty vehicles, like buses and tractor-trailers.

Jed Mandel, president of EMA (Truck & Engine Manufacturing Association), said that EMA has "worked consistently to assure that EPA and DOT adopt a single, national GHG/FE program applicable in all fifty states"

"We are in the process of reviewing today's highly complex rule to determine if it aligns with manufacturers' efforts and customer needs," Mandel continued. "If not, the Phase 2 program would impose enormous costs on our customers, constrain customer choice, and, as a result, impose significant challenges to its successful implementation."

For example, recently truck engine manufacturers developed an engine that uses diesel exhaust fluid (DEF), thus reducing nitrous oxide emissions. The environmental impact is changed from harmful to harmless emissions.

The rule and its requirements

The final rule will reduce carbon emissions by 1.1 billion tons and save truck operators about \$170 billion in fuel expense, according to the White House. This second phase of a regulatory push covering large trucks requires cuts in carbon emissions as much as 25% greater than the phase one rule issued in 2010.

The requirements target three phase-in dates--2021, 2014, and 2027--"providing lead time and multiple pathways to compliance," said EPA Administrator Gina McCarthy.

The new rule affects the vehicle class that includes school buses, large pickups, delivery and passenger vans, garbage trucks, and long-haul tractor-trailers. This class represents only about 5% of total highway traffic, but accounts for 20% of transportation-related fuel consumption and carbon emissions.

Read more...[EPA and NHTSA Adopt Standards to Reduce Greenhouse Gas Emissions and Improve Fuel Efficiency of Medium- and Heavy-Duty Vehicles for Model Year 2018 and Beyond](#)

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It's been a wet summer in Texas. "Heavy rains and the over-saturated ground forced a fuel storage tank at a retail store to surface back in June." yourhoustonnews.com

Video: Filling Blind Explosion



This is the CSB's Safety Video on the 2009 massive explosion at the Caribbean Petroleum, or CAPECO, terminal facility near San Juan, Puerto Rico. The incident occurred when gasoline overflowed and sprayed out from a large aboveground storage tank, forming a 107-acre vapor cloud that ignited.

While there were no fatalities, the explosion damaged approximately 300 nearby homes and businesses and petroleum leaked into the surrounding soil, waterways and wetlands. Flames from the explosion could be seen from as far as eight miles away.

Shop Fabricated Tank resources

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



Dealing with China's steel "dumping"



Anti-dumping demonstration in China

Over the past few years, "Chinese steel" and its invasion of the US market has caused consternation among both producers and manufacturers. In mid-April, the Office of the US Trade Representative held public hearings where several steel industry leaders spoke against what they believe to be illegal "dumping" of over-supply into the US steel market by China.

Subsequent government discussions in early June occurred during the Economic Track of the US-China Strategic and Economic Dialogue. In a press release reacting to the outcomes of that dialogue, AISI president and CEO Thomas J. Gibson said, "We appreciate the continued efforts of our government to engage China at the highest levels on the steel overcapacity issue and welcome the **new commitments by Chinese leaders to adopt measures to strictly contain steel capacity expansion, reduce net steel capacity, eliminate outdated steel capacity, and dispose of 'zombie enterprises'** through restructuring, bankruptcy and liquidation, as appropriate...But these commitments will only be meaningful if they lead to real results that produce a significant net reduction in excess steel capacity in China"

After the meetings, US Treasury Secretary Jack Lew said, "While efforts over the past several days cannot resolve our concerns, they do represent real progress." Specifically, China said it would follow through on plans to "shrink" its state-owned steel companies. Secretary Lew explained that China "promised to avoid policies that might encourage steel production growth and to wind down financially moribund 'zombie companies'" and that "Chinese officials also agreed to cooperate in a possible global steel forum to discuss industry issues." **China also promised not to "engage in 'competitive devaluations' or use the exchange rate to help China's exporters."** *Quoted from MSCI's Connecting the Dots, June 13.*

Meanwhile, on June 24, the US International Trade Commission ruled unanimously that imports of corrosion-resistant steel from China, India, Italy, South Korea, and Taiwan have injured US steel producers. The ruling means the **US Department of Commerce will soon issue a countervailing duty order on imports of these products from China, India, Italy, and Korea, and anti-dumping duty orders on imports of these products from China, India, Italy, Korea, and Taiwan.** According to Politico's "Morning Trade," the ITC's decision impacts imported products that were valued at \$1.8 billion last year. *Quoted from MSCI's Connecting the Dots, July 5.*



China produced 803.8 million tonnes of steel in 2015, more than all the other top producers combined.

Map courtesy World Steel Association

Industry Calendar of Meetings, Conferences and Events
[Click here](#)

STI/SPFA Education and Certification Programs
Click links for information and registration

CATHODIC PROTECTION INSPECTION TRAINING & CERTIFICATION
Sept. 20-21, Denver
Oct. 12-13, Kansas City MO
Nov. 8-9, Richmond VA

SP001 AST INSPECTION TRAINING & CERTIFICATION
Sept. 19-23, Denver
Nov. 7-11, Atlanta
Dec. 5-7, Owings Mills MD

FIELD ERECTED WATER STORAGE TANK SEMINARS
Sept. 15, Kansas City, MO
Oct. 18, Austin, TX

ONLINE CERTIFICATE Tank Integrity Management Certificate

RECORDED WEBINARS

- **NEW! Steel Pipe Flange Installation**
- **Petroleum Storage Tank Maintenance**
- **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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STI-SPFA/API Storage Tank Fundamentals Course



API and STI-SPFA are collaborating to present a **Storage Tank Fundamentals Course** on October 11, in conjunction with API's 2016 Valves, Tanks, and Piping Conference and Expo in Las Vegas.

This course is designed for inspectors, engineers, managers, and regulators who wish to increase their knowledge of storage tank facilities. Course topics

include:

- Special design considerations for chemical tanks
- Fire water tanks
- STI SP001 Inspection Standard
- Inspection of tanks to unknown standards
- Tank modification case studies
- And more topics, all taught by experienced fabricators and industry experts.

[Learn more and register here](#)

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Lead in water more widespread



More than 18 million Americans may have drunk water from systems with high lead level violations in 2015, according to a report by the Natural Resources Defense Council.

The problem may be even worse, since "many more water systems known to have such violations - including that in Flint, Michigan - do not even show up as having lead violations in the government database designed to track such problems," according to NRDC scientists and health experts. They found more than 5,300 water systems across the country violate federal rules limiting lead (and copper) in tap water.

[Read NRDC report](#)

Aging infrastructure

Compounding the problem is the fact that the nation's pipes and water mains are often 100-plus years old. According to the American Society of Civil Engineers, there are about 240,000 water main breaks a year, and the EPA estimates that up to 5,000 miles of water mains are replaced annually. Given the "end of useful life" of 100-year-old pipes, replacements could peak at 16-20,000 miles per year by 2035.

[Read ASCE report](#)

Where's the money?

Nearly half of registered voters feel that the nation's pipes, highways, and railroads have deteriorated over the last five years, according to a June 2016 poll by the Association of Equipment Manufacturers. Eighty to ninety percent of respondents say the nation's water, highway, bridge, and energy grids are in "some" to "extreme" need of repair. The American Water Works Association estimates that replacing every water pipe in the next 10 years will cost more than \$1 trillion.

Yet there has been reluctance in Congress to allocate funding for infrastructure repair and improvement. *The Atlantic* magazine's "CityLab" online column reports that "over the past decade, total capital spending on infrastructure has fallen in all but five states and the District of Columbia, and federal infrastructure investment over the past three decades has dropped from 1 percent to 0.5 percent of GDP."

[Read CityLab column](#)

Recent consequences

The City of Flint's enormous problem with lead-tainted water appears to be linked to the state cutting infrastructure investment.



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Tank Talk Editor
[Noël Zak](#)



STI-SPFA
944 Donata Ct.
Lake Zurich, IL 60047
847-438-8265
info@steeltank.com
www.steeltank.com

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A pipeline less than one year old failed in Texas earlier this year. The PVC pipe for the Texas project was supposed have a life expectancy of 30-50 years. In contrast, many design engineers today expect steel pipe to have a 50-100 years life.

[Read more about Texas pipeline failure](#)

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Connecticut allows 40 year tank life



On June 22, 2016, Connecticut's Department of Energy & Environmental Protection issued a change to their underground storage tank regulations. They are now allowing an "alternate life expectancy" to 40 years from the date of installation for tanks that satisfy the eligibility criteria.

Tanks eligible for this "alternate life expectancy" must be single- or double-walled FRP or composite steel tanks installed prior to 2003.

Tanks must be proven tight by testing the interstitial space and must continue to be tested annually.

[See the department's notice here](#)

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Oil reserve infrastructure needs work, too



The nation's oil infrastructure is in need of repair and refurbishment, says a report released by the Department of Energy. *The Wall Street Journal* article "U.S.'s Aging Oil-Reserve Infrastructure Needs an Update," appeared on September 7, 2016.

The Strategic Petroleum Reserve (SPR) is stored in 60 underground caverns in Texas and Louisiana. DOE says the storage complex is getting too old to function efficiently.

The money to fix the SPR system must come from Congress. In the upcoming fiscal years 2017 appropriations bill, DOE seeks \$374.4 million to address the issues in its report.

[Read DOE's Strategic Oil Reserve report](#)

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Co-optima: R&D project to develop "fuels of the future"



The Co-Optimization of Fuels & Engines (Co-Optima) is an initiative of the US Department of Energy. The project aims to simultaneously transform both transportation fuels and vehicles in order to maximize performance and energy efficiency, minimize environmental impact, and accelerate widespread adoption of innovative combustion strategies.

Among other research, development of optimum fuel may include considering higher percentages of ethanol in gasoline blends and ethanol-only fuel. Ethanol is seen by many as the only viable mass-produced non-petroleum fuel available at reasonable cost.

However, other additives also boost octane. N-butane is the simplest way to boost octane, but it comes with a set of disadvantages, including easy vaporization in warm weather. Another octane booster is alkylate. While more expensive, it does not vaporize easily.

[Read more about octane boosting](#)

High octane fuels are believed to better optimize engine efficiency, reducing harmful GHG tailpipe emissions, including carbon dioxide.

According to the DOE website, "This research and development (R&D) collaboration between the U.S. Department of Energy (DOE), nine national laboratories, and industry is a first-of-its-kind effort to combine biofuels and combustion R&D, building on decades of advances in both fuels and engines."

The Co-Optima project's goals to be completed by 2050 include:

- Add 9-14% to the national goal of 80% reduction in GHGs.
- Achieve 54 mpg per vehicle average.

[Read more about Co-Optima](#)

Getting ready for future fuels

The State of Illinois has awarded a \$1.44 million grant to offer higher ethanol blends at 20 retail stations, reports the Renewable Fuels Association. The grant will be used to help install underground storage tanks and new dispensers to offer E15, E30, E85, and biodiesel.

Also from the Renewable Fuels Association: "Wayne Fueling Systems, a global leader in fuel dispensing technologies for retail fuel stations, announced today (*August 30—ed.*) that all of its North American standard retail fuel dispensers will now be supplied as compatible and UL-Listed to all blends of ethanol up to 25 percent, becoming the first manufacturer to do so."

[Read more](#)

On the other hand...

According to Nissan Moto of Great Britain, "electric car charging locations will outnumber petrol stations in the UK by August 2020." Electric charging points have already increased from hundreds to thousands in just a few years.

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Opinion: STI's take on the EPA corrosion study



On July 20, the EPA released a report "[Investigation of Corrosion Influencing Factors in Underground Storage Tanks with Diesel Service](#)" (EPA 510R16001, July 2016). In addition to the report, EPA also developed a notice about corrosion risks in underground storage tank systems (USTs) storing diesel fuel.

Publication of EPA's report was picked up by numerous industry media, and often extrapolated the EPA report results to corrosion failures in steel tank walls, rather than the internal equipment. STI-SPFA responded by stressing that the EPA investigation covered corrosion—in both steel and non-metallic FRP tanks—in submersible turbine pump shafts, automatic tank gauge probe shafts, flapper valves, and ball valves—not tank walls.

This is STI-SPFA's response to an article that appeared in an online newsletter:

"The article 'EPA calls on diesel underground storage tank owners to monitor corrosion to prevent groundwater contamination' has a misleading focus on action by tank owner/operators, rather than on the prevalence and source of this corrosion.

"While the referenced [EPA press release](#) 'recommends owners check inside their tank systems and further investigate the condition of their diesel fuel tanks,' in fact, the components showing corrosion in ultra-low sulfur diesel (ULSD) storage tanks are not readily accessible and are not part of recommended maintenance procedure guidelines. There is no simple method for a tank owner to 'monitor' the internal tank equipment.

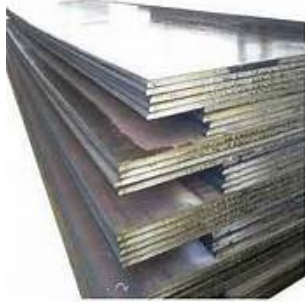
"In fact, the corrosion referenced in the EPA's report is a relatively new phenomenon that appears to be related to storage of ULSD. *EPA's study results indicate only to what extent this corrosion of storage tank internal components may be occurring. These results do not imply that the tank system and/or the owner/operator are at fault.*

"At this time, the cause of corrosion in tank systems storing ULSD remains unknown. Further research is underway by the [Coordinating Research Council](#) (CRC), a not-for-profit industry group which works both independently and with government "to develop the best possible combinations of fuels, lubricants, and the equipment in which they are used. To our knowledge, the EPA has no plans to independently pursue research, but will continue to cooperate with and contribute to CRC's efforts."

[See STI-SPFA's brochure about USTs, water, and corrosion](#)
[See Coordinating Research Council's flyer about diesel storage](#)

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US files WTO case challenging China trade rules



The Office of the United States Trade Representative recently announced that "...the United States has launched a new trade enforcement action against the People's Republic of China at the World Trade Organization (WTO) concerning China's export duties on nine different raw materials.

"When China joined the WTO, China agreed to eliminate its export duties on these products, but it has failed to follow through on this commitment..."

"The export duties China imposes provide substantial competitive advantages for Chinese manufacturers by making them more expensive for US manufacturers that rely on these raw materials to produce their downstream goods. These nine raw materials - antimony, cobalt, copper, graphite, lead, magnesia, talc, tantalum, and tin - are key inputs into high-value Made-in-America products in vital industrial sectors, including aerospace, automotive, electronics, and chemicals."

Inasmuch as these raw materials are used to make steel, China's export duties also contribute to "dumping" of Chinese steel in the US market. This practice is a key component of the downturn in sales of US-made steel.

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Steel Tank Institute - Steel Plate Fabricators Assn., 944 Donata Ct., Lake Zurich,, IL 60047

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