Tank Talk

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California SWRCB Provides Status Report: UL's Position with B5

Cal/EPA Secretary Linda Adams and the State Water Resources Control Board (SWRCB) requested that UL determine whether its Standards and Certification for petroleum diesel storage in USTs can appropriately be applied to biodiesel blends of up to B5.

UL recently issued its determination, which can be found on its website at: http://www.ul.com/gasandoil/b5.html.

According to the Cal/EPA letter, issued January 9, 2009, "UL conducted a technical review of biodiesel fuel and technologies. UL worked closely with the U.S. Department of Energy, National Renewable Energy Laboratory, Brookhaven National Laboratory, Oak Ridge National Laboratory, and the National Biodiesel Board.

UL also conducted performance testing of heating equipment using B5. The findings indicated no adverse safety effects, and that products intended to use biodiesel blends up to B5 that are compliant with applicable ASTM International fuel standards will not require special investigation by UL."

As a result, the SWRCB regards UL's decision as a compatibility determination for the storage of biodiesel blends up to B5 in UST's approved for petroleum diesel. UST systems installed with vacuum, pressure or hydrostatic monitoring will be allowed by California. However, other systems that rely fully on liquid sensors and automatic tank gauging for system leak detection do not yet meet CA SWRCB's minimum requirements for B5 storage systems, since testing of such leak detection equipment with B5 has not yet been completed.

"We are pleased UL has come to the conclusion that UL approvals for petrodiesel fully apply to B5 and lower blends, in line with the recent ASTM approval of up to B5 in the diesel spec ASTM D975," said Steve Howell, Technical Director for the National Biodiesel Board. He continued, "B20 approvals from UL and SWRCB are being aggressively pursued, and since ASTM recently adopted standards for B6 to B20, we anticipate speedy UL and SWRCB approvals for B6 to B20 as well."

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Burial Depth of Underground Steel Storage Tanks

A common question posed by industry is, "*How deep can I bury an underground steel storage tank*?" The answer is that steel tanks can be fabricated for burial at nearly any depth required. But before providing a technical justification for this response, let's review some history.

Shortly before the Environmental Protection Agency first promulgated rules for underground storage tanks in 1988, most tanks were buried three to four feet deep. Gas stations were much smaller back then and had fewer dispensers. Typical tank capacity was 8,000 gallons, and orders for tank capacities of 10,000 or 12,000 gallons were made for new, state-of-the-art convenient stores at busy intersections.

Suction systems were common, but the era of the submersible turbine pump (STP) was fully coming into vogue at that

time. The STP's enabled product to be pumped out of the tank as a "pressurized system." As a result, dispensers were no longer limited to installation in very close proximity to the tanks, and the number of dispenser islands served by one tank could be expanded significantly. Further, a new era of installations developed involving the placement of tank sumps above the tank. The sumps provided a location for accessibility to the STP, leak detection equipment, and a place where product leaked from pipes could drain.

Good installation practice is to slope the product pipe towards containment sumps. For example, Petroleum Equipment Institute's PEI RP-100 recommends a slope of 1/8 inch per foot. Assuming the pipe is drained toward the tanks sump, then the further the dispenser island is from the tank, the greater the elevation differential between the pipe at the dispenser and the pipe at the tank. To accommodate this practice, tanks would need to be buried further below grade.

By 1996, when Underwriters Laboratories published its Ninth Edition of UL 58, the Standard for Steel Underground Tanks for Flammable and Combustible Liquids, a new marking was required on each tank. Each tank had to be marked with the maximum burial depth. Tank capacities of 10,000 gallons and 12,000 gallons had become more commonplace for many service stations under construction.

Many steel tank fabricators responded by marking their tanks with a 5 foot maximum burial depth. The belief at that time was that a 5 foot burial would cover nearly all installations. However, the fuel dispensing business continued to evolve as petroleum dispensing stations became bigger and bigger. Today, at a typical new truckstop facility, tanks as large as 20,000 gallons, and even 30,000 gallons, are installed for dispensing fuels at 12 or more dispenser island locations. Five foot burial depths were no longer sufficient for all installations.

Another important change occurred in the 1996 version of UL 58. Up until then, all steel tanks labeled UL 58 were built to a chart that established minimum wall thicknesses.

Steel tanks built to the Underwriters Laboratories Standard for External Corrosion Protection Systems for Steel Underground Storage Tanks, UL 1746, initially published in 1989, incorporated an "External Pressure Test" that did not exist in UL 58. This performance test could be used as an alternate method of establishing the steel thickness at a given burial depth.

Steel Tank Institute researched underground steel tank performance in scenarios involving high groundwater and/or deep tank burials and with specific corrosion systems. See *Tank Talk* August/September 1994 issue for further details or click here.

As a result of the research, the UL 58 standard was published in 1996 with a new means of determining underground steel tank wall thicknesses. A formula from Roark's Formula for Stress and Strain was incorporated into the standard. From the use of this formula, UL 58 stated that "the minimum steel shell thickness or the maximum steel tank length can be calculated." Specifically, a buckling pressure, P, calculated the external pressure at the bottom of a submerged steel tank in water. The water depth equals 5 feet or the maximum burial depth of the tank, whichever is greater, plus the tank diameter.

So what does this mean to the industry?

- Steel tanks can be buried deeper than 5 feet.
- Steel tanks can be marked to meet UL 58 or UL 1746 requirements with any burial depth required, but no less than 5 feet.
- Many steel tanks are already built with the capability of being installed at much greater depths. The formula enables a simple calculation to be made to determine maximum burial depth or the minimum wall thickness.
- Steel tank fabricators can custom build a tank and mark the tank at much greater depths.