

Underground Storage Tank Systems and Ethanol Compatibility

As higher percentages of ethanol (greater than 10% ethanol by volume) are blended with gasoline, owners and operators must ensure their underground storage tank (UST) systems are compatible. What may have been compatible with E10 may not be compatible with a higher percent ethanol blend. Before you store or dispense a higher percent blend of ethanol, such as E85, you must verify that your ethanol fuel path is compatible.

The Underground Storage Tank Section of IDEM offers the following guidance based on a review of available information on ethanol's compatibility with UST systems, industry literature and protocols, and published reports and research documents. Without converting to compatible equipment, your UST system could degrade and a product release could occur. Ultimately, the equipment and components must be compatible with the percentage volume of ethanol-blend you intend to use.

Compatibility

IDEM's Administrative Rule 329 IAC 9-3.1-3 requires UST systems to be compatible with the product stored. Further, Administrative Rule 329 IAC 9-2-1 places certain requirements on UST systems which include E fuel standards. Components and equipment used for storing/dispensing conventional fuels are time tested for compatibility and readily available through your petroleum supplier. High percent ethanol, however, does not have the same compatibility characteristics of conventional fuels when it comes to storage and dispensing. Soft metals such as zinc, brass or aluminum, which are commonly found in conventional fuel storage and dispensing systems are not compatible with E85. Steel tanks and piping must be UL listed or certified by the manufacturer and under warranty with no indications of internal corrosion. Some nonmetallic materials may also degrade when in contact with ethanol such as natural rubber, polyurethane, adhesives (used in older fiberglass piping), certain elastomers and polymers used in flex piping, bushings, gaskets, meters, filters, and materials made of cork. In order to store and dispense high percent ethanol, fiberglass and steel UST systems/components must be listed by Underwriters Laboratories, Inc., or certified by the manufacturer.

Accelerated Corrosion and Conductivity

Ethanol can accelerate corrosion in steel UST systems by scouring or loosening deposits on the internal surfaces of tanks and piping. If a corrosion cell exists, the ethanol can accelerate (scour) the corrosion cell and cause a perforation. As mentioned above, ethanol is not compatible with soft metals such as zinc, brass, copper, lead, and aluminum. These metals will degrade or corrode in contact with ethanol and possibly contaminate a vehicle's fuel system.

Tank leak detection equipment composed of certain metals (mentioned above), polymers, and elastomers may not be compatible with ethanol. Because ethanol has a higher conductivity than gasoline, capacitance probes may not work in ethanol-blend fuels. Verify the floats used in magnetostrictive probes are alcohol compatible and that the ATG system is properly calibrated for ethanol.

Converting to a Higher Percent Ethanol

Here are the procedures you will have to follow in converting your system to high percent ethanol blend:

1. You will need to verify that your dedicated fuel path is compatible with the percent of ethanol to be stored and dispensed. Contact your petroleum equipment supplier or Indiana certified installer to discuss converting to a higher percent ethanol blend and ensuring that your UST system has appropriate equipment.

The following equipment/components/materials must be compatible with the ethanol blend you intend to store and dispense:

- Fill pipe/drop tube
- Auto shutoff or overfill valve
- Tank (Is the warranty in effect? Is it certified or UL listed for the product stored?)
- Internal lining material used on relined tanks
- Submersible pump and pump impeller
- Gaskets, bushings, couplings
- Line leak detectors
- Leak detection equipment (ATG probes, floats, sump sensors)
- Piping material (UL listed or certified by manufacturer)
- Pipe adhesives/glues
- Flex connectors, grommets
- Filters*
- Dispensers*
- Hoses* (including breakaway couplings or fittings)
- Nozzles*
- Spill containment and sumps

* Not regulated by 329 IAC 9

2. Any water intrusion problems must be fixed. No level of water is acceptable for ethanol blend fuel due to phase separation problems. You will need to make certain all fittings and connections at the top of the tank are tight (no vapors escape and no water enters) and that all sump and spill containment covers prevent water from entering. Hydro-sensitive filters, although not mandated by rule, may be useful in offering early indication of the presence of water.
3. The tank that is being converted to high percent ethanol must be clean. After any water problems have been fixed, you must clean the tank dedicated to high percent ethanol to remove all sludge from the bottom of the tank. Any sludge or particulates in the bottom of the tank may be suspended in the ethanol and cause problems with filters and fuel lines.

4. Fill pipe and access covers must be properly identified. (You don't want the transport driver to mistakenly deliver E85 to an E10 tank.)
5. You must submit IDEM's [Notification for Underground Storage Tanks \(Form 45223\)](#) to the Underground Storage Tank Section indicating the change of product that will be stored in the UST. The form must be signed by the UST system owner. (The form 45223 may be downloaded from the above link or you can contact the Underground Storage Tank Section at (317) 308-3064 or toll free at (800) 451-6027, extension 308-3046 to obtain form 45223).

Note: Please indicate the high percentage ethanol product in the space "Other" within the appropriate tank column in Part G.

6. You should also contact your UST insurance carrier to inform them of your plans to convert to a higher percent ethanol. They may have further requirements beyond those of IDEM.
7. For more information about the UST Program, contact Skip Powers, Section Chief at (317) 308-3039 or at spowers@idem.in.gov

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