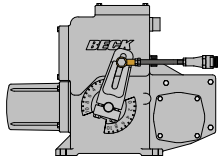


Ethanol Blending Optimization at CITGO Truck Terminal



Louisiana U.S.A.

The ethanol blending process is a critical part of gasoline terminal operation and has a significant impact on product quality, meeting environmental regulations and profitability. Optimizing the process is very important, but does present some control challenges. For example, thermal expansion of gasoline and ethanol do not occur at the same rate, and the blended mixture has to be isolated from water due to ethanol's miscibility in water. For these reasons, many terminals blend in real-time while loading directly into the tanker trucks, but, the required control strategy doesn't allow much room for problems or inconsistencies. Getting the needed control begins with accurate, consistent and reliable valve actuation.

CITGO personnel identified ethanol blend valve actuators as a key to improving the blending process at the Lake Charles Truck Terminal. Inexpensive conventional electric actuators were in use on the 2" ethanol blend valves. An evaluation of the actuator performance proved that they were not responsive enough. In this case, wide dead bands typical of many traditional electric actuators caused process dead time and overshoot, which led to poor control, cycling, and variability. The net result was an inability to closely control the ethanol concentration in the mixture and the risk of producing an out-of-specification blend in a truck.

Poor control is always costly, but producing an out-of-specification blend is very costly.



Figure 1
Beck IIE-169 Rotary Valve Actuator on Ethanol/Gasoline Blending Application. [Hazardous Location Rated Class I Div 2]

When a truck is loaded with a bad blend, the whole mixture must be pumped out and reprocessed elsewhere. In an effort to avoid these costly problems, CITGO personnel decided to test two Beck electric actuators on ethanol blend valves. The impact on blending control was immediate. The ethanol concentration target of the mixture is 10%+/-0.4% and after a short time with the Beck electric actuators installed, CITGO personnel reported that the concentration of ethanol in the mixture had never been closer to the 10% target. The success of the installation was so significant that CITGO recommended using Beck on all blend valve applications and is in the process of upgrading its terminals throughout the US.



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