

Bulk & Terminal Products Div.
Precision Tank Gauges
Mass Measurement
LP gases and NH3



Bulk & Terminal Products Div.
Precision Tank Gauges
Mass Measurement
refined fuels, oils, and
petro-chemicals

FTI - innovating solutions for LPG Marketers

Our first major innovation - a highly accurate gauge for LP gas tanks

Fueling Technologies was created in 1999 for the express purpose of creating a reliable and accurate gauge for LPG bulk storage tanks.

We were approached with information that existing float gauge technology was over a half of century old. That technology was new and innovative when introduced. It was an improvement over “spit tube” technology. Our research included finding that existing technologies had issues such as “sticking floats”, inaccuracy ranging from 5% to much larger numbers, and/or allowing vapors to escape into the atmosphere.

After a year of investigation our team was formed to bring new technology to the LPG industry. It was decided to make the technology “portable” to provide more accurate inventory data for refined fuels Aboveground Storage Tanks as well.

Research indicated a need to for technology that would improve reconciliation of bulk product storage activity. Often there is skepticism of accuracy claims. FTI supports our claims by 3rd party verification on each and every tank gauge installed to 99.5% or better. Handbook 44 weights and measures regulations allow for bulk meters to have a tolerance of plus or minus 1%, an allowance that would not be acceptable for checking accounts, and other “liquid” assets.

The decision was made that mass measurement using buoyancy tube displacement was the only feasible technology that accounted for LPG vapors, and dealt with product density due to temperature variations.

In the spring of 2002 a propane rail terminal test site in New Mexico became the first bulk storage tank FTI site. It had 60,000 gallon propane tanks and admittedly a serious reconciliation problem. Shortly thereafter, three more gauges were installed in 500 gallon generator tanks at telecommunications sites in Oregon. It became clear our product met the accuracy goals when we reported a 6 gallon usage in one of these tanks. It was rapidly determined the “lost” fuel was consumed running the generator.

One of our first standard production LPG gauges was installed with a marketer in NY. We were happily amazed when the customer sent us data showing that comparing our gauges with a weighted load over a public scale showed 39040 lbs, a variance of 38.4 lbs compared with gauge readings. **That is accuracy of 99.76096%**. We are so grateful to this customer for both sharing her experience of accuracy on the gauge, and the best test of accuracy, weighted loads over a public scale, which we have adapted to.

How does 99.5% or greater mass accuracy compare with 98% level accuracy?

An example of "accuracy by level" versus mass measurement in a 30,000 131" tank.

A 2% change in level is a 5.24% change in liquid volume (gallons); and when you add in the 2.03% volume of the vapor content - the total error is 7.27%.

2% Level Error Can Be 7.27% Actual Error

Tank %	Inches	Gallons	% Delta	Vapor	Vapor %
50% Reading	65" Level	15,491 Gallons		350 Gallons Liquid in Vapor	2.26% ACCOUNTED FOR WITH VAPOR
52% Reading	67.6" Level	16,303 Gallons	5.24% DELTA	331 Gallons Liquid in Vapor	2.03% ACCOUNTED FOR WITH VAPOR

It is common for LPG float gauges to have a level error of 5% or more!

How can you effectively reconcile using level technology?

Our second major innovation - the mass measurement chamber

A solution for existing bulk storage tanks that lack an opening for the precision gauge. Mount the gauge in an external fabricated chamber to simulate the actual tank. While retaining the accuracy it did raise the cost of the installation. A number of these are installed in the US, Mexico, Jamaica, and The Dominican Republic. The MMC is a very good solution to tanks without a 2" top opening available. Often this is a case with the "MultiPort™" type PR valves.

MMC - Mass Measurement Chamber



Our third major innovation - a much more cost effective solution to the “no opening” issue - FTI’s Gauge2Port™

Gauge2Port™ is listed to UL 119 by ETL, and ASME certified for SCFM rating.

 Fueling Technologies, Inc. Woodinville, Washington	
Gauge2Port For LPG and NH3 Gas	
Part No.: 2500304	
FTI Gauge2Port Safe for use when 65450	
Installed in Accordance With	
Installation Manual 9000148	
Class I, Div 1/Div 2	
Conforms to UL Subject 119-2009	
Certified to ULC Subject C567-74	

Gauge2Port™ with Marshall Excelsior MEV250VM250FT-9200 rated at 9200 SCFM tested to ASME requirements and installed in the FTI Gauge2Port™



Almost all LPG bulk storage tanks in the field lack an opening on top for adding a precision gauge. Gauge2Port™ (ETL listed to UL 119 and rated at 9200 SCFM by ASME certified testing) solves the issue without expensive and time taking field welding on ASME pressure vessels. The Gauge2Port™ converts one of the 2” PR valve openings to serve both the function of the PR valve, and installation of a mass measurement precision gauge. This is a “win win”.

In the field there are a number of tanks with the “MultiPort™” PR assembly. These tanks will not normally have a 2” opening available. For these applications FTI’s MMC (Mass Measurement Chamber) accommodates the precision gauge very well, and is time proven with successful installations dating back to 2004.

Major innovation number 4 - FTI's Internet/Cellular communication modules.

FTI's Internet/Cellular service opens remote unattended sites to the advantages of two way communications that is convenient, flexible, and reasonably priced.

Installing land-line telephone service is expensive when you need to have service brought to remote sites.

Land line monthly service ranges from \$45 to \$75 per month, plus toll charges.

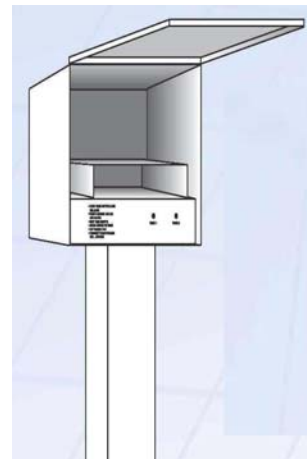
You can access your Fueling Technologies gauges by an Internet connection from your computer desktop (any or all your company computers), from your laptop at home, in a hotel room, or any "WiFi" location. Flexibility, convenience, and efficiency!

Eliminates the expense of options such as RF (radio frequency), LAN (local area network), and telco (telephone modem).

Enables better factory support. Your site can be serviced by FTI's home office easily and conveniently, In most cases this support can be done without onsite technicians, quickly and usually without charge.



Indoors Version, in a mounting enclosure. Enclosure has a cover, not shown in this picture.



Outdoor Version, installs in a outdoor lockable enclosure, mounting on a 48" steel pedestal. Enclosure has a heater and a fan, both are thermostatically controlled. For very harsh climates the enclosure is available insulated.

Major innovation number 5 - to be released soon is FTI's terminal automation module.

FTI's terminal automation module is coming the summer of 2011. It's features and options will include:

- Remote Display accessible outdoors at the tank farm.
- Constant power - eliminates using battery power
- Automated tank readings at the start and end of transactions, in or out of the tank, without human interaction.

