
MTG vs. Magnetostrictive

This is a comparison of the MTG "Multi-function Tank Gauge" to a new Digital Magnetostrictive flex probe. The rigid digital Magnetostrictive probe is the best technology in tank gauging for small fiberglass storage tanks of clean fuel. This is an application where none of the negatives associated with other service applications can normally come into play. However, the use of the a new Digital Magnetostrictive flex probe in large metal aboveground storage tanks is not a good solution in our opinion for the following documented reasons:

The Magnetostrictive probe has mechanical moving parts, i.e., floats. The floats have a magnet attached to the float that provides the field to produce the pulse on the wave guide, thus providing the level & water measurement. The float rides up and down in the product and is exposed to any metallic partials that have been picked up in the processing, transportation, or storage of this product. It has been our experience (representing or OEM for three different Magnetostrictive manufacturers) that most ATG's tanks will experience float hang up due to metallic particles and require periodic cleaning of the floats. The partial particle buildup also affects movement of the float and measurement accuracy of the device.

According to the American Petroleum Institute (API) Manual of Petroleum Measurement Standards, Chapter 3 - Tank Gauging, Section 1B - Standard Practice for Level Measurement of Liquid Hydrocarbons in Stationary Tanks by Automatic Tank Gauging states in 3.1B.3.3 the "Accuracy Limitations of Tank Measurements". It lists "bottom movement", "movement of the tank gauge reference point or the top mounting point during tank transfers", "random errors in level, density, and temperature measurement", etc.

First, how does a flexible probe with a spring anchor measure "bottom movement"? What structural effect does it have on the probe and spring or the accuracy of the measurement? The Magnetostrictive probes are top mounted, thus are subject to reference point movement, the expansion and contraction of the tank during normal filling and emptying. The MTG is bottom referenced with a flexible roof collar, thus allowing it to remain on the tank floor. The MTG measurement is always based from the floor as the reference point.

Net volume is calculated by either level or mass. In order to calculate level net volume you must have accurate level measurement, accurate temperature measurement, and accurate density measurement. The MTG provides all three of these measurements and mass net volume as well. The MTG uses the most accurate Class A, four wire, Platinum RTD's to ensure accurate multi-point temperature measurement. What type of RTD's are used within the Magnetostrictive probe? Is there enough room in the probe for 20 conductors for temperature? A one degree F uncertainty in the calculation of inventory on a 45 ft. tank can be as much as 1/2" (15 mm) level error. Note: Mass measurement doesn't require temperature in the calculation of net volume. The MTG also provides multiple density strata, to laboratory accuracies. The Magnetostrictive requires the data to be entered into the probe or software, thus requiring laboratory analysis of samples to determine net volume.

We can go on and on about the economic and operational benefits of the MTG "Multi-function Tank Gauge". All we ask is that you look at the information from all manufacturers carefully and ask questions. Consult sources such as API Chapter 3.1B, 7.4, and 16 before making a decision on any gauge technology.

Please see the GSI Bulletin 3000 MTG for more information on the Multi-function Tank Gauge.

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	Magnetostrictive	MTG - Mass Tank Gauge
Maintenance Cost:		
No Moving Parts	No, Floats	Yes
Self Calibrating /Diagnostics	No	Yes
Remote configuration & trouble shooting	No	Yes
Possible float hang-ups (metallic particles)	Yes	No
Bottom measurement to within 1"	No	Yes
Installation Cost:		
Delivery (Custom made to order)	Yes	No
Bottom reference error	Yes, Standpipe req. for accuracy	No
Probe flex error or Spring tension error	Yes	No
Tank entries required	One	One
Voltage required (Electrical)	24Vdc	12 - 24Vdc
Wiring connections	Single	Single
Communications / Integration	MODBUS RTU, DDA	MODBUS RTU, 10BASE-FL, WEB
User configurable register map	No	Yes
Alternative communications to hardwire	No	10BASE-FL, Radio, BlueTooth™, Cellular, Satellite, WEB, etc.
Equipment Cost:		
Local display / Interface	Add	Add
* Magnetostrictive or MTG	Base	Base
** Temperature Averaging Probe	Included	Included
*** Water Bottom	Included	Included
**** Density (Measured, not inputted)	No	Included
***** Vapor pressure (Measured)	No	Included
Software (XP Microsoft Certified)	No	Add
Data provided by Primary Instrument		
Mass (Net Volume)	No	Yes
Level (Net Volume)	Yes	Yes
Multiple Spot Temperatures	Yes	Yes
Multiple Density Strata's	No	Yes
Free Water (Interface)	Yes	Yes
* % of Water in Product	No	Yes
2nd Interface	No	Yes
* % of Water in Emulsion	No	Yes
Vapor Pressure	No	Yes
Vapor Temperature	No	Yes
Leak detection (Mass)	No	Yes
Alarm - Multiple Level Sensors	No	Yes
Alarm - Mass	No	Yes
Alarm - Multiple Spot Temperatures	No	Yes
Alarm - Multiple Pressure Points	No	Yes
Alarm - Multiple Density Strata	No	Yes
Alarm - Vapor Pressure	No	Yes
Alarm - Vapor Temperature	No	Yes
Real-time Tank Profile	No	Yes
Quantitative & Qualitative Measurement	No	Yes