

Development and Commercialization of a
Non-Invasive Continuous Level Gauge for
LP Gas Stationary and Mobile Tanks:
How This Technology is to be Transferred
to LNG Applications

For: The American Society of Gas Engineers
By: Adept Science & Technologies, LLC
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Challenges to Develop a Better Liquid Level Gauge

- Environmental Issues
- Cost Effectiveness
- Accuracy
- Ease of Use





Continuous Level Gauge (CLG)

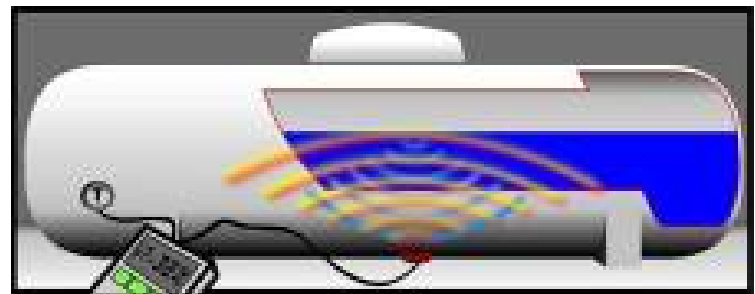
Applications in LP Gas



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The Maximus™ CLG

- The Maximus™ Continuous Level Gauge (CLG) for bulk tanks is commercially available today.
- The CLG uses a proprietary ultrasonic technology to measure liquid level.

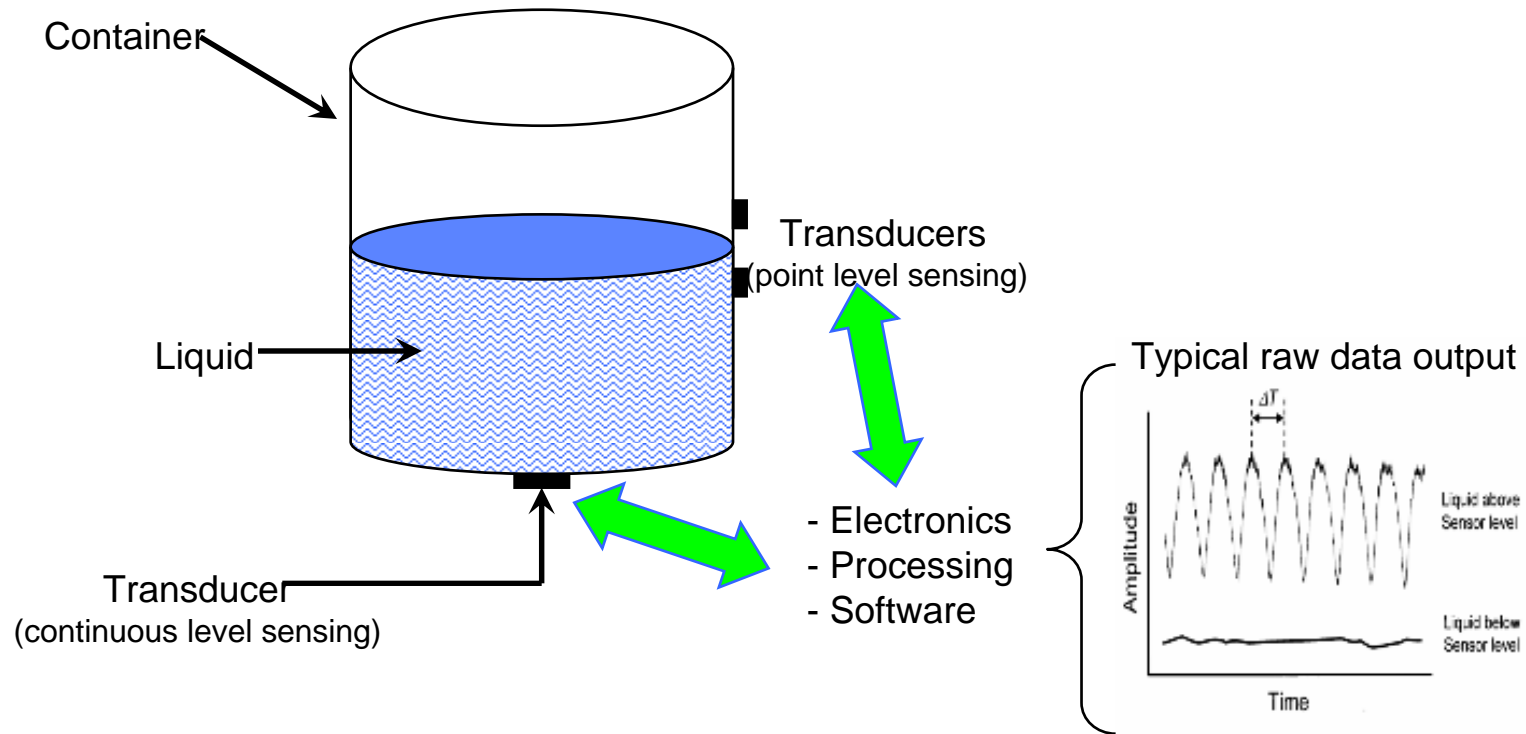


How the Maximus™ CLG Works

- From the sensing head mounted on the bottom surface of the tank the signal moves up through the liquid to the liquid-vapor boundary from where it bounces back to the sensor head.
- The CLG then calculates the height of the liquid.
- Based on operator-entered data about the tank's wall thickness, tank diameter, and shape of the caps, the liquid volume is calculated and displayed in “percent full”, or in gallons.
- The gallons reading can be normalized to 60°F.



CLG Diagram



Successful Applications of the Maximus™ CLGs

- SchagrinGAS, Elkton, MD



Successful Applications of the Maximus™ CLGs

- North Hollywood School District, Los Angeles, CA



Successful Applications of the Maximus CLGs

- GenPak, Cedar City, UT:

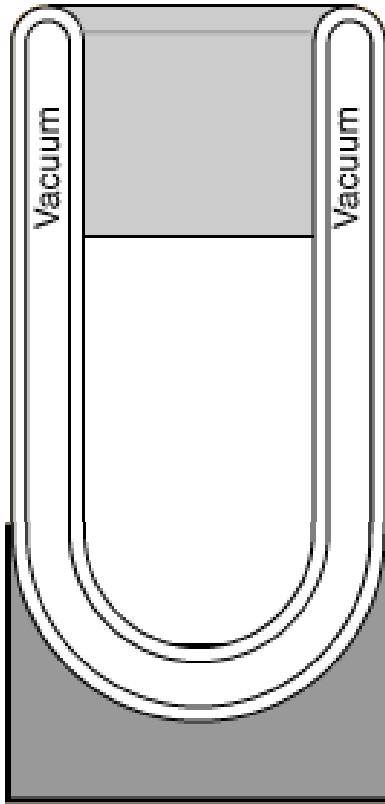


Converting the Maximus™ CLG for LNG Applications

**The Challenge is a Major
Difference in Wall Structure
(2 Walls + Insulation Space)**



LNG Storage: Dewar Flasks & Current Methods of Volume Measurement

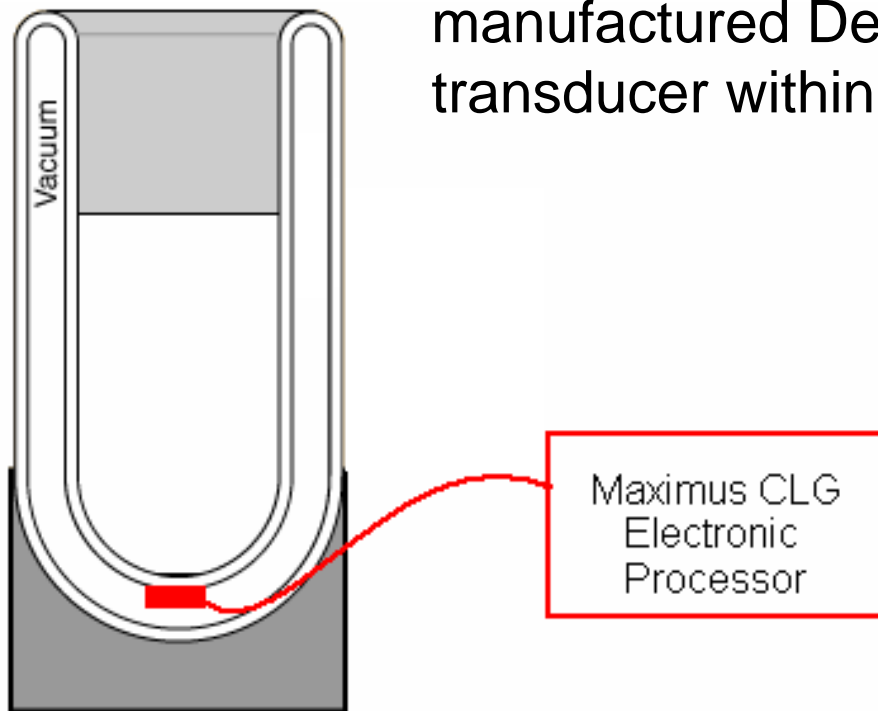


- Dewar flasks are used to store LNG.
- These flasks are simply evacuated or otherwise insulated containers, used to store liquids at low temperatures.
- Currently, volume within these tanks are measured by differential pressure gauges and/or floaters.
- Servo motor based gauging systems (Archimedes' Principle) too expensive and complex.
- Capacitance gauges can freeze and provide false readings.



CLG's Could Be Built Into Newly Manufactured Dewar Flasks

- The Maximus CLG can be built into newly manufactured Dewar flasks by installing the transducer within the insulated volume.



Advantages and Benefits to the LNG Industry

- Less expensive to buy and operate
- Accurate (+/- 1%) and easy to use
- Safer
- Reads down to 2.5% full
- Readily adapts to remote monitoring systems
- Electronic box can be portable and can be shared among several Dewar flasks
- Environmentally friendly (no releases to atmosphere)

