

# *UST Inspector Training Webinar*

## *Tank Tightness Testing*



 **Tanknology**

# *Tank Tightness Testing – Non-Volumetric*

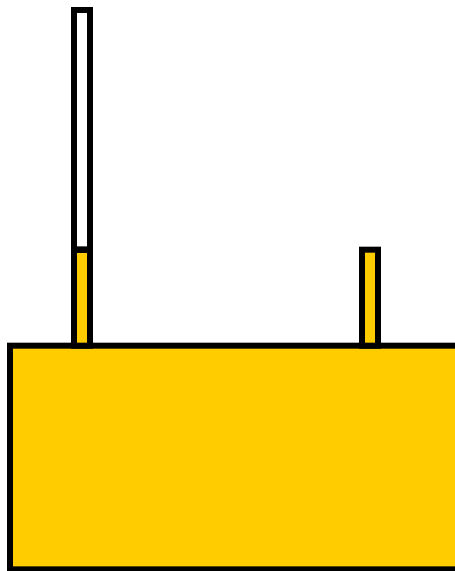
**Non-Volumetric** Tank Tightness Tests (TTT), as the name implies, do not rely on volume measurement to determine the tightness (Leak) status of a storage tank.

Some TTT manufacturers use a combination of Volumetric and Non-Volumetric techniques to determine a tanks tightness.

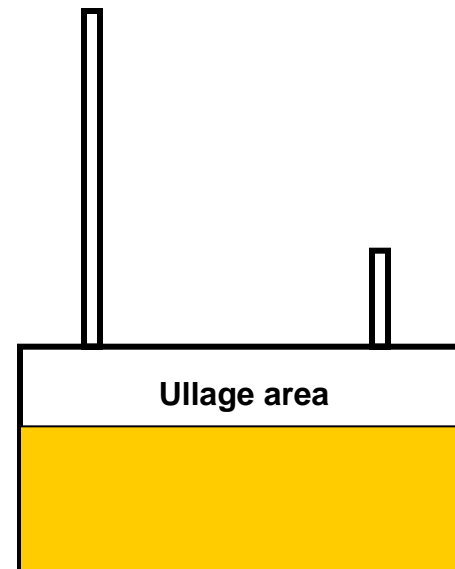


# Tank Tightness Testing – Non-Volumetric

Most Non-Volumetric TTT are Under Fill Methods



Over Fill



Under Fill



# *Tank Tightness Testing – Non-Volumetric*

**Non-Volumetric TTT's employ one or more of the following Techniques to determine the tightness of a storage tank.**

**Apply Vacuum or Pressure to the tank ullage**

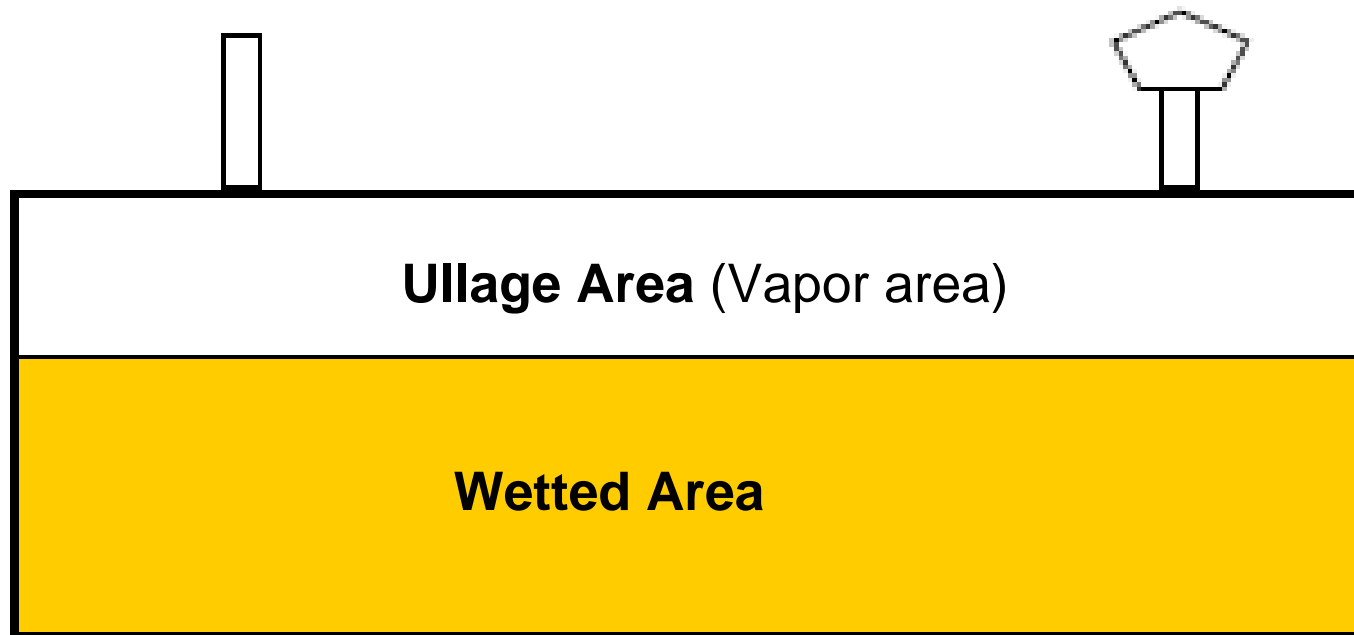
**“AND Monitor For”**

**Audible ingress of air  
Measured increase of water  
Product level increase or decrease  
Vacuum or Pressure decrease**



# *Tank Tightness Testing – Non-Volumetric*

**Within the same test method, different leak detection modes often apply to the wetted area and Ullage area of a tank**



# *Tank Tightness Testing – Non-Volumetric*

Widely used TTT System Manufacturers (Non tracer type)

- **Estabrook EZY CHEK Systems (originally listed as Horner EZY CHEK)**
- **USTest, Inc. (previously listed as Sound Products Manufacturing, Inc.)**
- **Tanknology**



# *Tank Tightness Testing – Non-Volumetric*

## Basic Principles of Operation

- Apply vacuum to the tank
- Monitor for change in acoustic signal relative to baseline audio
- Monitor for ingress of water using a water detection sensor

**Estabrook EZY CHEK Systems  
(originally listed as Horner  
EZY CHEK)**

**EZY 3 Locator Plus**



# *Tank Tightness Testing – Non-Volumetric*

## **Basic Principles of Operation**

0.1 gph/ A tank system should not be declared tight when there is a substantial increase in the acoustic noise signal (when the tank is under pressure or vacuum) above the background signal (prior to pressurization or evacuation) in the frequency interval of 10 kHz to 20 kHz./7,550 gallons (pressure test), 5,250 gallons (vacuum test).

**USTest, Inc.**  
**(previously listed as Sound  
Products Manufacturing, Inc.)**

**UST 2000/U**  
**(Pressure and Vacuum Test)**





# *Tank Tightness Testing – Non-Volumetric*

## Basic Principles of Operation

**Apply vacuum to the tank**

**Monitor for audible ingress of air or water**

**Monitor vacuum decay pattern**

**Monitor for increase of tank bottom water via a water sensor**

## **Tanknology**

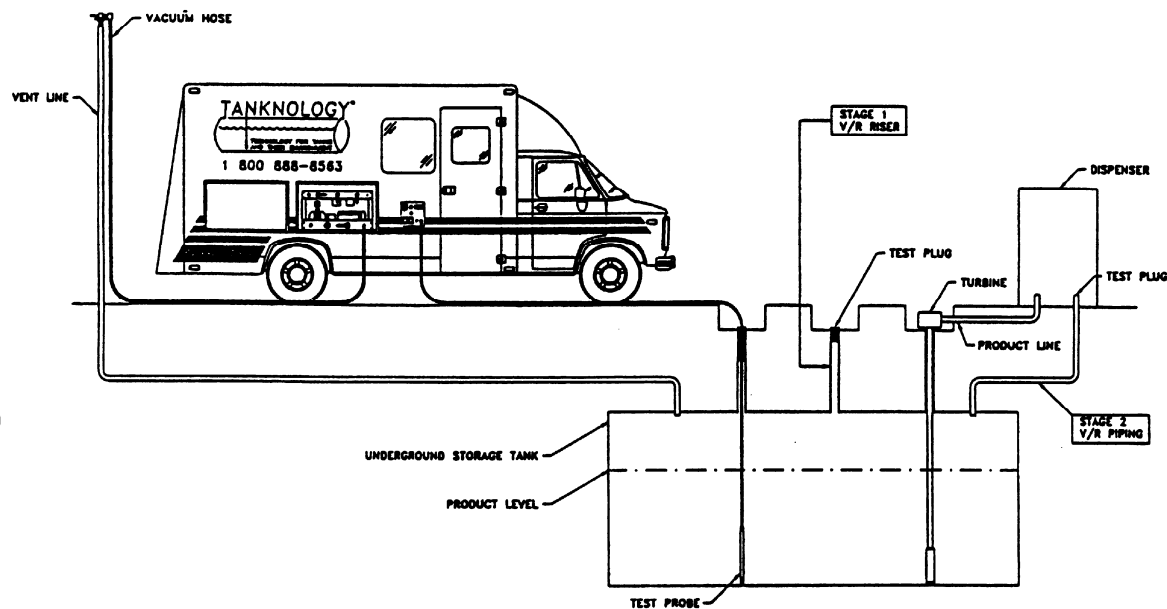
### **VacuTect**

**NON-VOLUMETRIC TANK  
TIGHTNESS TEST METHOD  
(VACUUM)**



# Tank Tightness Testing – Non-Volumetric

## Tanknology Typical Tank Test Set-up

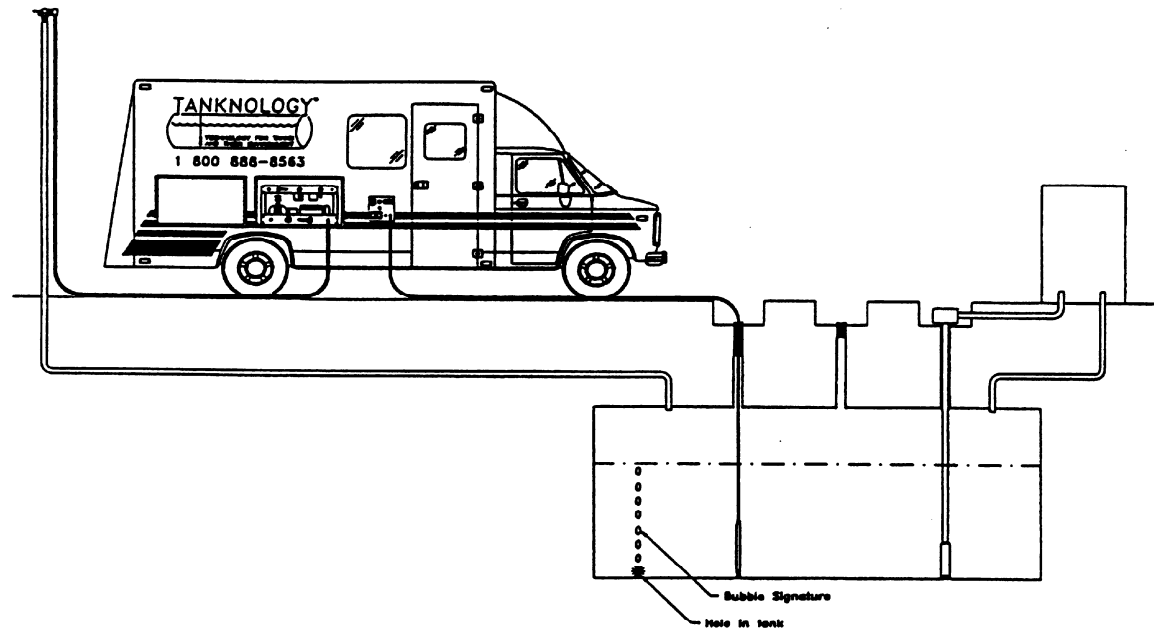


1. Vapor Recovery piping plugged off as necessary.
2. Vacuum Hose connected to vent line and truck.
3. Test Probe inserted in tank below product level.
4. Vacuum applied on tank system.



# Tank Tightness Testing – Non-Volumetric

## Bubble Signature due to Hole in Tank

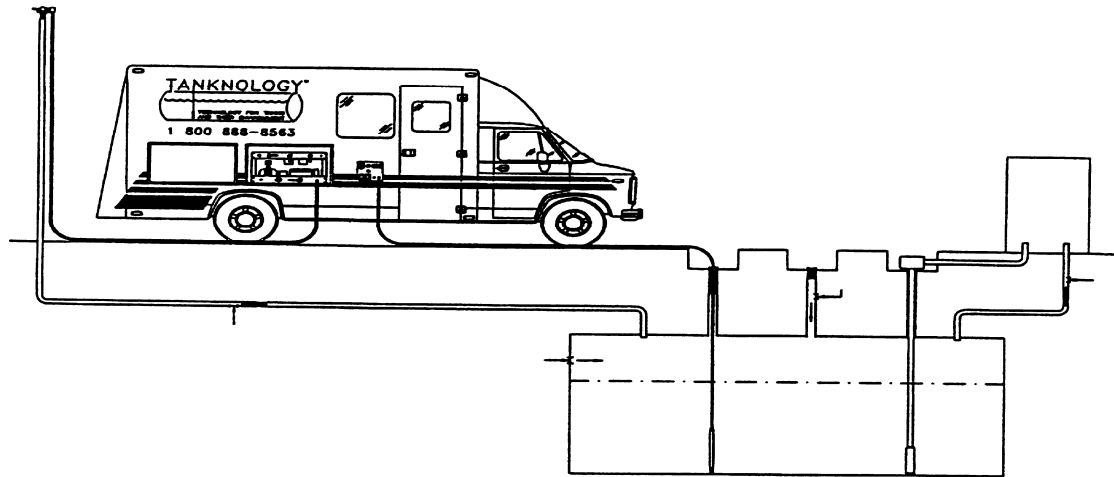


1. Tank System under vacuum.
2. Hole in tank below product level allows air to enter tank.
3. Since air enters below product level, a bubble signature is produced.



# Tank Tightness Testing – Non-Volumetric

## Air Ingress due to Hole(s) Above Product Level

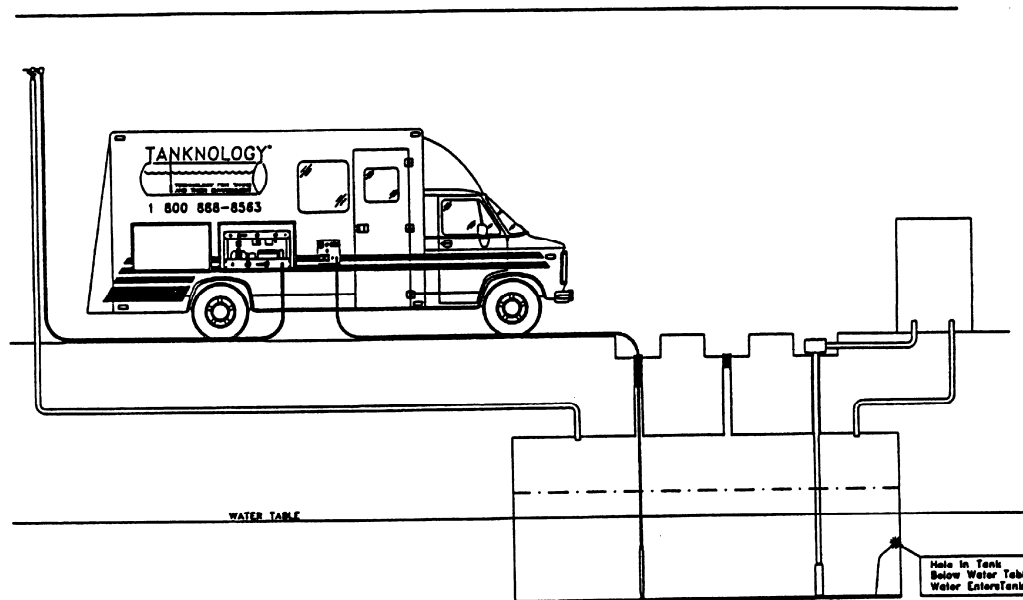


1. Vacuum applied to tank system.
2. Air Ingress detected due to one or more of the following:
  - A. Hole in Vent Line
  - B. Hole in Fill Pipe or Vapor Recovery Riser
  - C. Hole in Vapor Recovery piping
  - D. Hole in Tank above Product Level
3. All test plugs are double checked for leaks.
4. All aboveground Vapor Recovery piping is double checked.
5. Risers are eliminated as source of problem by lowering test plugs to tank top.



# Tank Tightness Testing – Non-Volumetric

## Water Ingress due to Hole Below Water Table



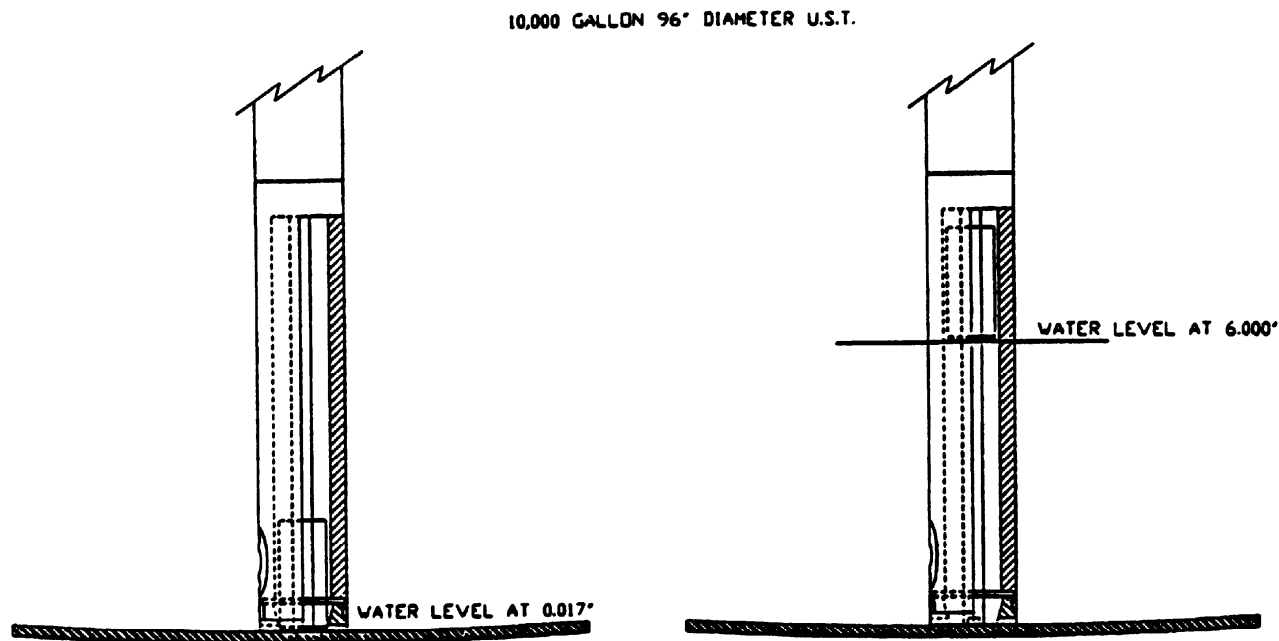
1. Vacuum applied to Tank System.
2. Hole in tank below Water Table allows water to enter Tank System.
3. Note that it doesn't matter whether the hole is above or below product level to allow an ingress of water.
4. Water Ingress detected and measured by Water Level Sensor on bottom of Test Probe.



# Tank Tightness Testing – Non-Volumetric

## END VIEW OF TANK BOTTOM

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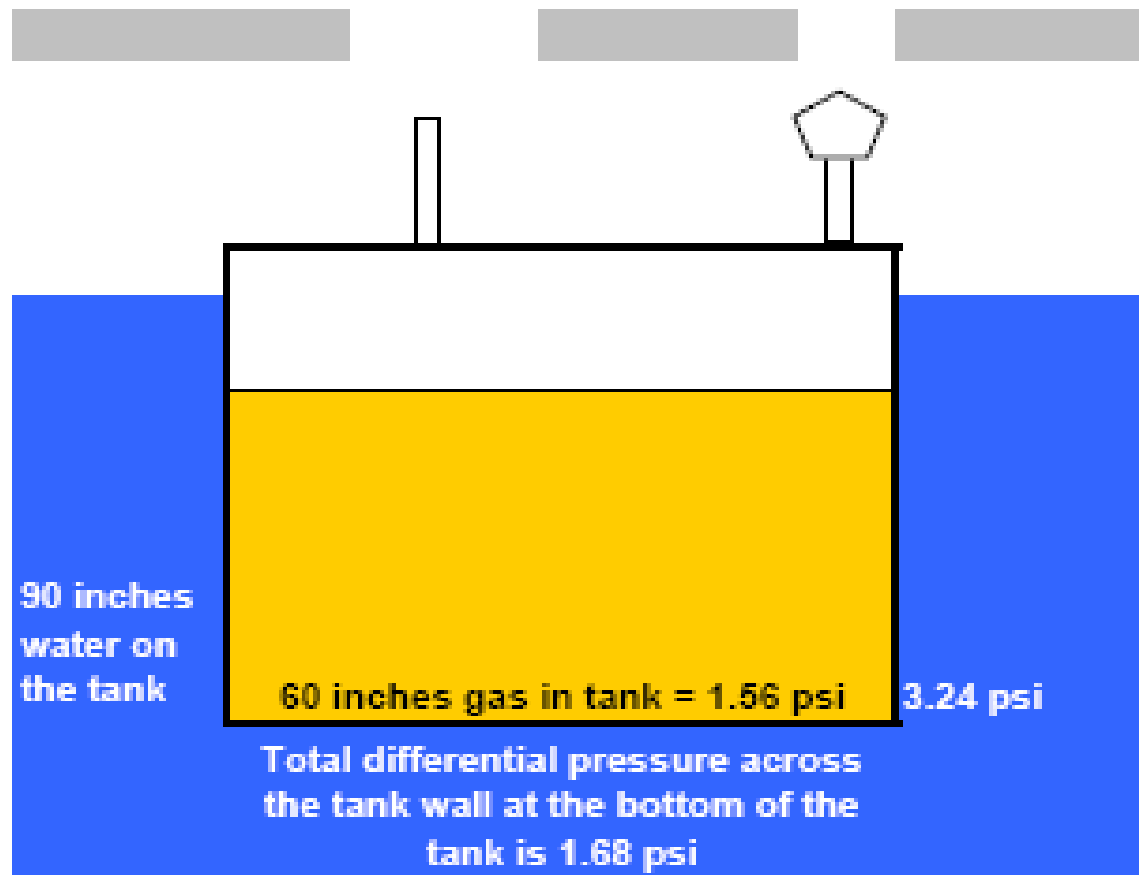
This diagram shows Tanknology's Magnetstrictive Water Level Sensor.

Minimum data = 0.017" ; Maximum = 6".



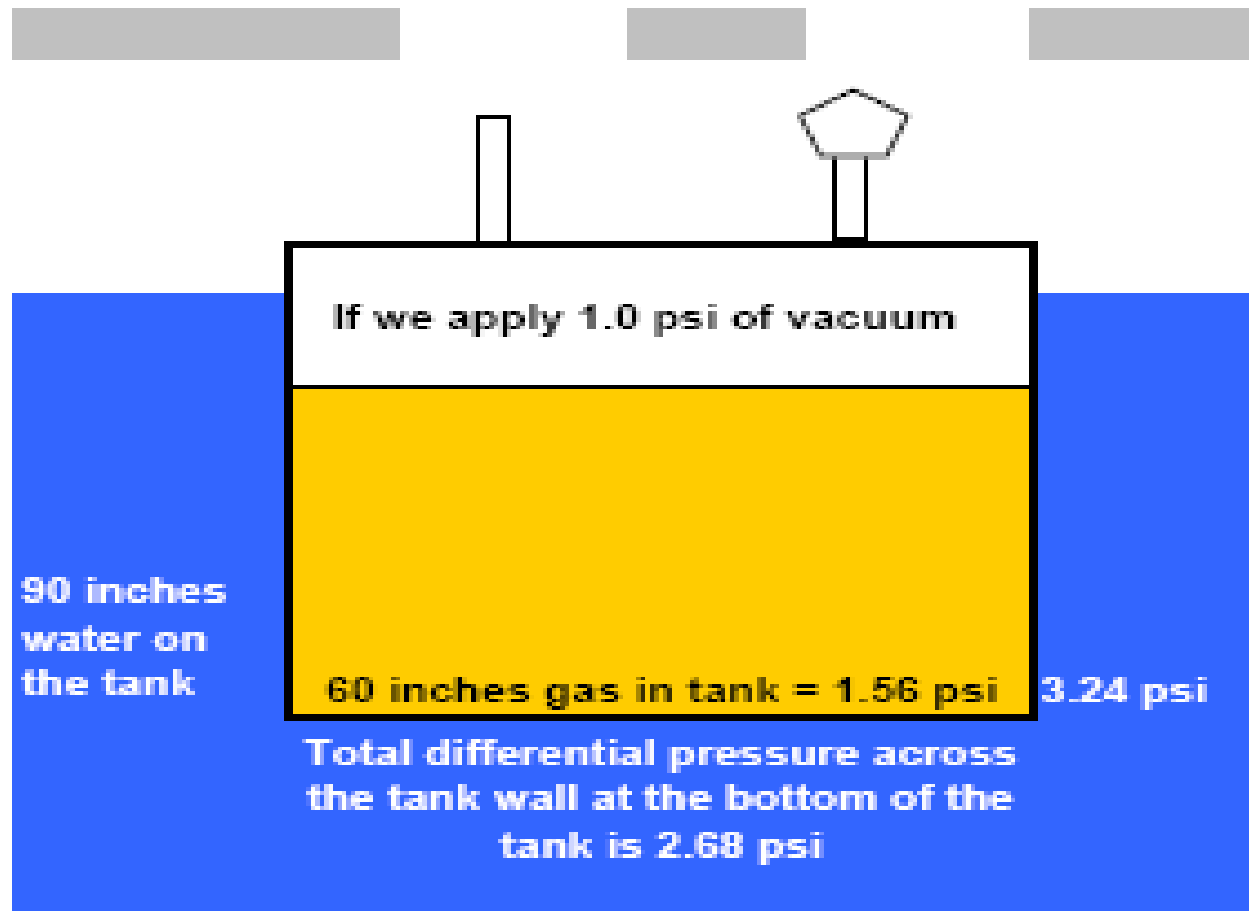
# Tank Tightness Testing – Non-Volumetric

TTT's must consider all pressures on a tank to avoid tank damage



# Tank Tightness Testing – Non-Volumetric

The test system must consider all pressures on a tank to avoid tank damage





# *Tank Tightness Testing – Non-Volumetric*

## **Limitations that apply to some Non-Volumetric Test Methods**

**Microphone (hydrophone) should be located within 60 feet of any possible leak source.**

**Vacuum test method may not be effective in some tank excavation backfill (such as clay) because it may plug holes in tank.**

**If free product is present in tank excavation backfill, a leak in the free product zone may not be detected by a vacuum test method.**

**Background noise may interfere with operators ability to hear audible sounds**

**Excessive differential pressure across the tank wall at any location in the tank could damage tank.**

