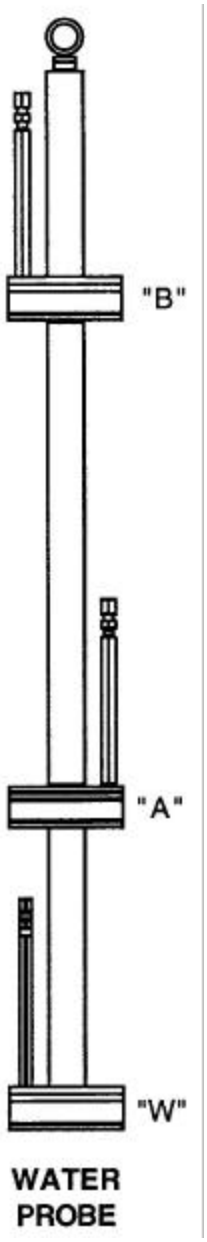
PETRO TAG™ 400 - TECHNICAL NOTE

WATER INTERFACE LEVEL MEASUREMENT



WATER PROBE

To measure the level of the interface between the water bottom and the fuel in a tank PETRO TAG uses a probe with an extra pressure measuring plate near the tank bottom. A standard PETRO TAG probe has two measuring points, Designated "A" and "B". The water interface measuring probe has three, "A", "B", and "W" as shown in the figure to the left. The pressures measured at the "A" and "B" plates are used to calculate the density of the fuel above the "A" plate. The pressures measured at the "W" and "A" plates are used to calculate the average density of the fluid between those two points. Since the density of water is known, the level of the water/fuel interface can be calculated based on the density relationships. The ratio equation is shown below.

$(\rho w-\rho f)(\rho w-\rho m)=(HA-HW)/(HA-HI)$

Where:

ρw = the known density of water
ρf = the measured density of the fuel
ρm = the measured density of the fuel and water mixture between the "W" and "A" plates
HA = the height of the "A" plate
HW = the height of the "W" plate
HI = the water interface level
Solving for the water interface level, HI yields:

$HI=HA-((HA-HW)(\rho w-\rho m))/(\rho w-\rho f)$

If the density measured between the "W" and "A" plates is halfway between the density of the fuel and the density of water then the interface level is halfway between the "A" and "W" plates. If the measured density is equal to the density of the fuel then the water interface is below the "W" plate, ie no significant water is present. If the measured density is equal to the density of water then the interface level has risen above the "A" plate and corrective action should be taken.

EXAMPLE 1

If the density of the fuel is 850kg/m3, the density measured between the "A" and "W" plates is 900kg/m3, the height of the "W" plate is 25mm and the height of the "A" plate is 175mm then the height of the water interface is calculated as shown below.

HI=175-((175-25)(1000-900))/(1000-850)

HI=75

Therefore PETRO TAG would report a water level of 75mm.

EXAMPLE 2

If there is no water present above the "W" plate then the density measured by PETRO TAG between the "W" and "A" plates will be equal to the density of the fuel. If the variables above are refused then:

HI=175-((175-25)(1000-850))/-(1000-850)

HI=25

However, since the height of the "W" plate is set at 25mm the actual water level could be anywhere at or below that level. In this case PETRO TAG reports;

"Water Less Than 02.5cm"

EXAMPLE 3

If the water level is higher then the "A" plate then the density measured by PETRO TAG between the "W" and "A" plates will be equal to the density water. Again, repeating the variables used above yields:

HI=175-((175-25)(1000-1000))/(1000-850)

HI=175

However, since the height of the "A" plate is set at 175mm the actual water level could be anywhere at or above that level. In this case PETRO TAG reports;

"Water More Than 17.5cm"

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