

## *Exceeding Expectations*

It's a Thin Line....

As we all know water and oil don't mix but somehow in the petroleum industry, these two substances enjoy getting together and it's usually not until the pumps have stopped do they separate and are able to be gauged. It's a thin line between love and hate as well as oil and water.

No one wants to buy oil including water therefore the latter is subtracted out from the total product received or loaded. Settling times of an hour are usual practice for products lighter than 30 API in order to assess accurate water cuts but some terminal procedures call for 12 hours of settling time.

Generally speaking a water cut is obtained through use of a water bob. A water bob is a brass device (Ref. Fig 1), which is coated with a water paste and lowered through the gauging hatch until it hits tank bottom. Depending on the 'water cut' the paste may need to be placed further up onto the actual gauge tape. This type of gauging is called innage gauging (Ref.2). The paste is activated by the presence of water and turns color marking the bob with a measurement to be interpreted on the tanks strapping charts.



Fig. 1 Water Bob

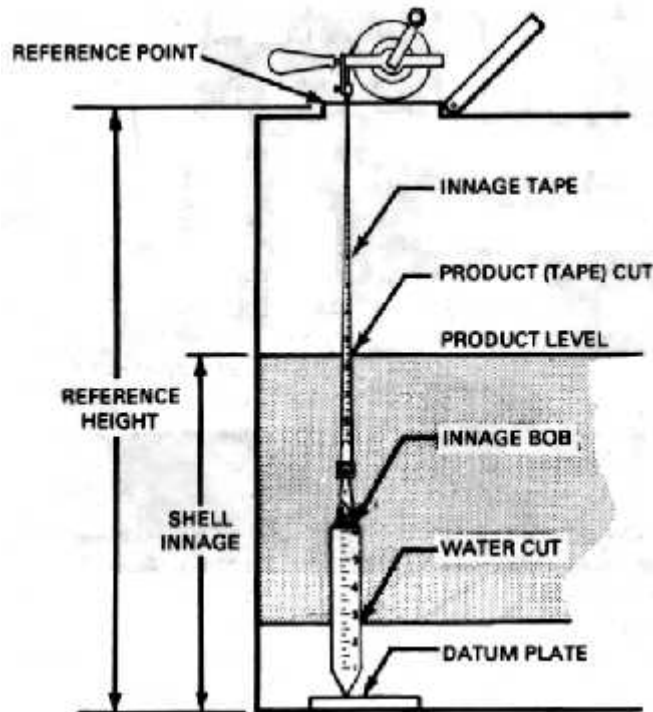


Fig. 2 Innage gauging

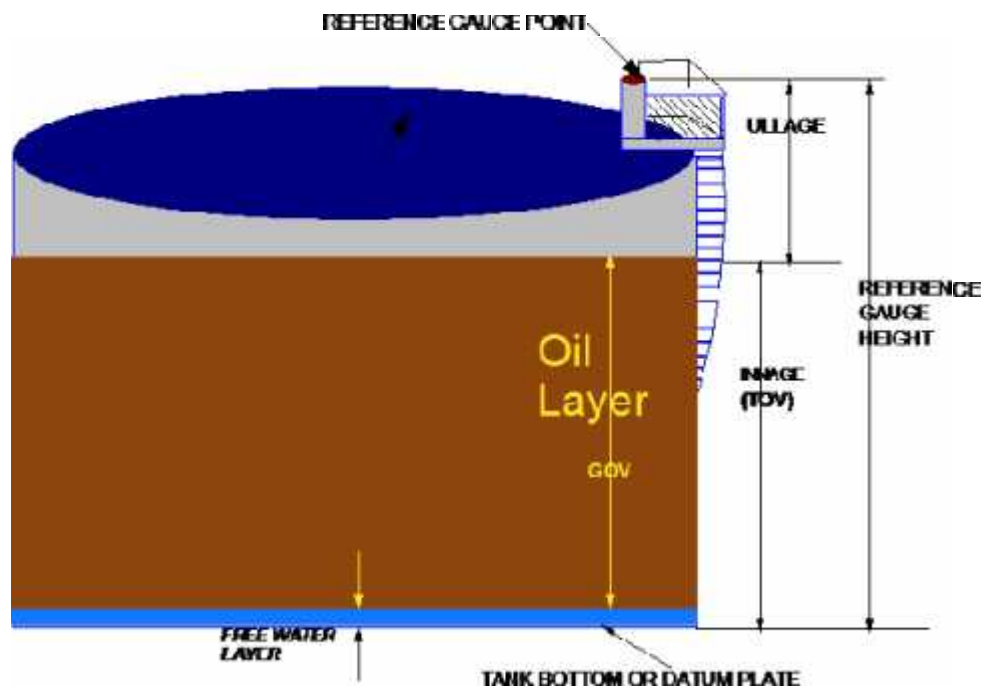


Fig. 3 Summary

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There are a few manufacturers of water finding paste and the most common ones are listed as follows. Please note in some cases, different products call for different pastes.



### **KOLOR KUT, WATER FINDING PASTE**

Kolor Kut water finding paste is golden brown in color; upon contact with water it turns a brilliant red. Will successfully gauge all petroleum and by-products for water content and accurately indicate the water/product interface. Also may be used in sulphuric acid, nitric acid, hydrochloric acid, soap solution, salt and other chloride solutions.



### **KOLOR KUT MODIFIED WATER FINDING PASTE**

Kolor Kut Modified Water Finding Paste has been designed for use in Methanol, Ethanol enriched fuels in all proportions when they are water-free but relatively small amounts of water can cause separation of alcohol from the fuel. The mixture settling to the bottom of the storage tank is predominately alcohol by most water detection pastes. Kolor Kut Modified changes from dark brown to bright red on contact with water. Phase separated alcohol solutions with as little as 6% water will turn the paste yellow.



### **McCABE WATER LEVEL INDICATOR**

McCabe Water Level Indicator is green in color; when the paste is immersed for 30 seconds or more, it will change to a shade of red in the presence of free water

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### **MASTER WATER LINE FINDER**

Master Water Line Finder turns red in water. When withdrawn, gauge will show exact water level in red



### **SARGEL WATER INDICATING PASTE**

SARGEL water indicating paste turns from a white color to pinkish/red on contact with water. SARGEL is a water/alcohol indicating paste, which shows the presence of water bottoms in storage tanks containing solvent, gasoline, oil, and other materials. It works especially well in alcohol blend systems.



### **TESTMASTER WATER INDICATING PASTE**

Testmaster paste detects and locates water in fuel oil and gasoline tanks. Shows exact volume present by turning fluorescent yellow-green on the dip stick. Does not separate or turn color in jar. If water is present, use Aquasorb. Specified by U.S. Armed Forces for use in jet aviation fuels.



### **GASOILA ALL PURPOSE WATER INDICATING PASTE**

Ideal for E-10 Applications! Fast, reliable way to detect water in fuel storage tanks. Accurately detects phase separation in Ethanol blend applications. For all petroleum fuels including ethanol and methanol blends, diesel, kerosene, #2 oil, JP-4, JP-5 and more. Works in seconds, even in extreme temperature conditions. Paste will turn yellow-green in the presence of water.

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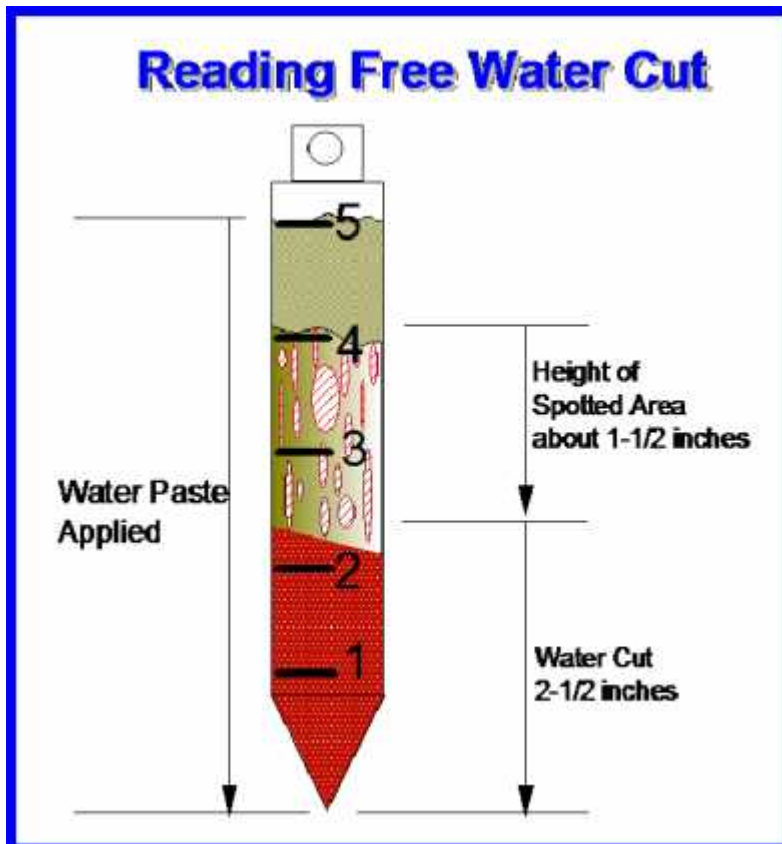
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## UNIVERSAL WATER FINDING PASTE

Universal Water Finder (UWF) Paste is designed to detect the presence, and particularly the level of the aqueous phase in tanks containing GASOLINE, GASOLINE/ALCOHOL (ETHANOL) BLENDS, JET FUEL, DIESEL FUEL, RESIDUAL FUEL, CRUDE OIL and OTHER organic liquids. Green paste turns bright Red on contact with water

In general terms, the lighter the product, the easier it is to determine a water cut. Unfortunately, obtaining a "clear cut" does not always happen especially on certain crude oils, residual fuels or emulsions where a significant amount of water is held in suspension which results in "spotting" of the water finding paste (Ref Fig. 5). This "spotting" can also occur if there is sediment at the bottom of the tank, the spotting can be slight or severe. Knowing the properties of the tank and product you are inspecting will help you determine if free water is present or the spotting is a result of water held in suspension or if sediment exists at the bottom of the tank.



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## Fig. 5 "Spotty Water Cut"

Most inspectors will use 2 different kinds of paste in an attempt to eliminate any ambiguity, some brands react more clearly on certain types of oil.

Water finding pastes are also often used on "closed system" electronic oil / water interface gauging tapes to help determine the water cut on cargoes held under inert gas pressure where oil/water emulsions are suspected.

It is important to note that due to high sediment build up in some tanks, finding the bottom of a tank can be difficult if not impossible; under these conditions, any water cut obtained should be treated as an "ullage" from the top of the tank by subtracting from the official gauge height to determine the water/sediment gauge.

## Tank Bottoms

All shore tanks usually have a means to easily decant the water from a product. Tank bottoms are either flat with a sump incorporated to draw the water, can be a "crown bottom" where the center of the tank is higher than the sides thus all the water can be decanted from "side draws" or finally "inverted cone" where the center of the tank is depressed and water is drawn from a bottom suction pipe.

Determining the water level on a flat or crown bottom must be done from the side of the tank and conversely, water cuts on inverted cone bottoms must be done from the center of the tank. Tanks with sumps incorporated will usually have access to obtain a water cut since this will be the most accurate location to determine if free water exists. The tank strapping charts will tell you the nature of the tank bottom and should be consulted prior to gauging.

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