

# **Fluid Properties: Density and Interfacial Tension (IFT) - Quantitative Impact on Petroleum Column Capacity Evaluation in Exploration and Production**

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Estimates of supportable column height in accumulations are routinely made in the petroleum industry. Capillary pressure is usually quantified using mercury injection experiments on physical samples of candidate seal rock, with the results expressed as a supportable column height using notional “oil” and “gas” fluid properties.

In this paper we show that over-simplification of fluid properties (density and interfacial tension) can lead to significant errors in predicted column height. An IFT model for “live” fluids properties leads to significantly different predicted column heights than when using “default values”; furthermore the IFT model proposed by Schowalter can be significantly improved upon.

Secondly, armed with these refined fluid descriptions, we present a method to invert column capacity from observed column heights in accumulations that are in capillary equilibrium with their seals (i.e are leaking). This avoids the practical problem that the critical pore throat size across the areal extent of a sea can not be found using the sparse sampling available in wells.

We introduce a parameter called “Column Capacity” ( $CC = \text{Capillary Pressure} / \text{IFT}$ ) which is a true rock property, with all fluid effects normalised out. CC (in units of kpsi.m/N) ranges from values  $< 1$  in some shelfal mudrocks to around 14 in some well-compacted deep water mudrocks. Our current effort is focussed on compiling a global library of mudrock CC trends, according to sedimentary facies.