Filter-Drier Pressure Drop

Would there be a significant pressure drop through a drier if you have a full column of vapor vs liquid? For example if for whatever reason my drier is only seeing vapor, could it potentially display a large TD across it solely because it’s a vapor and not as dense as a liquid?

Pressure drop through filter-driers is based on refrigerant mass flow, not the refrigerant state. For example, a 5-ton R-410A air conditioning system would use a C-164S filter-drier (16 cubic inch), and would have a pressure drop of 0.27 psi at a full load condition. This is with the filter-drier seeing 100% liquid, with a mass flow based on 5-tons. That same filter-drier used in the suction line application, with the filter-drier seeing 100% vapor, with the mass flow based on 5-tons, would have pressure drop of 5.5 psi.

Now, if this system were operating with a significant amount of flash gas in the liquid line, accounting to 50% reduction in total mass flow, the C-164S filter-drier would have a pressure drop of 0.074 psi. TD only occurs if the amount of pressure drop would cause the liquid flowing through the filter-drier to cause liquid flashing.

"Liquid flashing is required for TD to occur through a filter-drier."

This occurs if the pressure/temperature of the entering liquid is such that after experiencing a pressure drop through the filter-drier, the new saturation temperature of the refrigerant (at the reduced pressure after the pressure drop) is lower than temperature of the liquid entering the filter-drier, then there would be no temperature difference...even though there would be a pressure drop.

Liquid flashing is required for TD to occur through a filter-drier. You will not see a TD across a filter-drier with superheated vapor flowing through it...regardless of the pressure drop.

Question from Christopher Hanser of New York, NY. Answer from Dave Demma, CM, National Accounts Manager, United Refrigeration, Inc.