

msac MANUFACTURERS' SERVICE ADVISORY Council HOTLINE

The Manufacturers' Service Advisory Council provides expert answers to your technical questions

Filter-Drier Pressure Drop

Q 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?

A 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, amounting 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.

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

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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.

If the liquid entering the filter-drier was sufficiently subcooled, such that the new saturation temperature of the refrigerant is higher than the

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.

RSES Journal is looking for TECHNICAL QUESTIONS to ask MSAC Members!

There are two ways to submit a question:

1. Visit www.rses.org/msacquestion.aspx and fill out the online form.
2. Email your question to msac@rses.org.

Please be specific when referencing products or equipment—give manufacturer name, model number, serial number and year of manufacture when possible. Answers will be sent as quickly as possible and published in an upcoming issue of *RSES Journal*.