DEEP Coil Series

DEEP Coil for IAQ (Indoor Air Quality)

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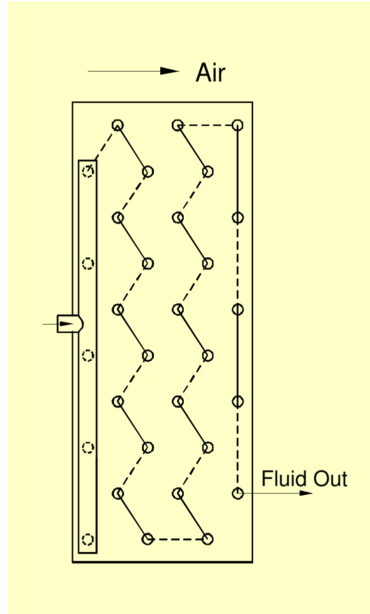
The DEEP coil can be effective in indoor evaporator application. The open fin spacing – 6 fpi vs. 22 fpi -- allows prompt draining, alleviating coagulation (beading) of condensate molecules. These condensate beads turn into ice. The icing reduces airflow both quantity as well as uniformity. This further accelerates icing, as it reduces the heat transfer. Persistent stagnant moisture encourages mold growth which is unhealthy for indoor air quality. Many of the current coils apply a coating to the fins to enhance quick draining of condensate. This coating adds another step in the manufacturing process, increasing the OEM cost. The coating also dulls the sharpness of the punches, increasing the fin-die maintenance cost.



Given the much reduced icing in the DEEP coil, the refrigerant/chilled water velocity can be slowed to achieve the desired dehumidification. For example (see sketch), the circuitry can be arranged so that the 1st row has 5 circuits with a velocity reduction by 1/5th. The 2nd to 6th rows can be configured to provide reduced number of circuits if so needed to maintain the desired high velocity. This can be an important consideration in tow-phase media such in vapor compression refrigeration. The low velocity will allow more coil surface to be below dew point, which will provide more efficient dehumidification. Such velocity reduction in the current high fin density (up to 22fpi in some PTAC units) is not viable, since it will cause immediate icing, and will make the coil non-functional. The flexibility afforded by the DEEP coil, in combination with wide fin spacing and tube spacing, provides means to control and manage the dew point to extract most moisture in the air. Such flexibility over circuiting is not available in micro-channels.