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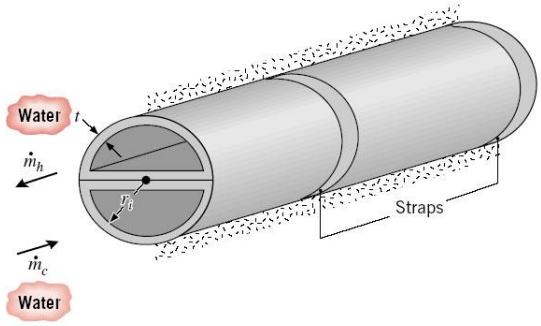
CHG 2314 **March 29, 2019**

Quiz 10

Solution

Consider a double-wall heat exchanger used to transfer heat between liquids flowing through semicircular tubes. The flow of the hot stream is counter-current to the flow of the cold stream, as shown in the diagram. When the mass flow rates of the hot and cold streams are $\dot{m}_h$ and $\dot{m}_c$, the length of the exchanger is L and the corresponding inlet temperatures are $T_{h,in}$ and $T_{c,in}$, respectively, the outlet temperatures are $T_{h,out}$ and $T_{c,out}$, respectively.



Please fill up the table below showing the effect (**increase = I**, **decrease = D**, **no change = NC**) of a change in the following parameters on the heat transfer coefficient on the hot (h_h) and cold (h_c) sides and the outlet temperatures $T_{c,out}$ and $T_{h,out}$. Assume that in all cases the flows on the hot and cold sides are fully developed and h_h and h_c do not change when $T_{c,out}$ and $T_{h,out}$ change.

Description of change	h_h	h_c	$T_{h,out}$	$T_{c,out}$	q
Mass flow rate of hot fluid $(\dot{m}_h)$ increases, in case when the original and the increased flows are turbulent	I	NC	I	I	I
The length of the exchanger decreases	NC	NC	I	D	D