Example

The average convection coefficient for water flowing through a circular tube is to be determined *experimentally*. In the experiment, steam condenses on the outer surface of a thin-walled circular tube with 50-mm diameter and 6-m length. This maintains the tube at a uniform surface temperature of 100°C. Water flows through inside the tube at a rate of $\dot{m}$ = 0.25 kg/s, and its inlet and outlet temperatures are $T_{m,i}$ = 15°C and $T_{m,e}$ = 57°C, respectively. What is the experimentally determined average convection coefficient associated with the water flow?

$T_S = 100°C$

$T_{m,i} = 15°C$

$T_{m,e} = 57°C$