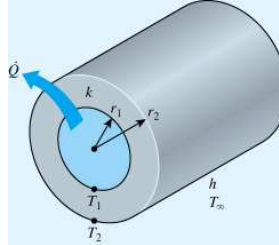


## 4.2.3 Steady Heat Conduction

### EP#2.6 Heat loss through in insulated steam pipe (Cengel et al Example 3-9)

A 3-mm-diameter and 5-m-long electric wire is tightly wrapped with a 2-mm-thick plastic cover whose thermal conductivity is  $k = 0.15 \text{ W/m}\cdot\text{K}$ . Electrical measurements indicate that a current of 10 A passes through the wire and there is a voltage drop of 8 V along the wire. If the insulated wire is exposed to a medium at  $T_\infty = 30^\circ\text{C}$  with a heat transfer coefficient of  $h = 12 \text{ W/m}^2\cdot\text{K}$ , determine the temperature at the interface of the wire and the plastic cover in steady operation. Also determine whether doubling the thickness of the plastic cover will increase or decrease this interface temperature.



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