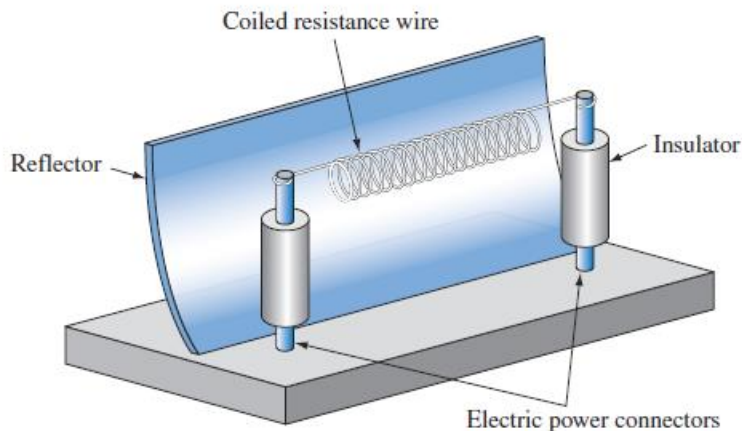


CANKAYA UNIVERSITY
FACULTY OF ENGINEERING
MECHANICAL ENGINEERING DEPARTMENT
ME 313 HEAT TRANSFER

Fall 2016

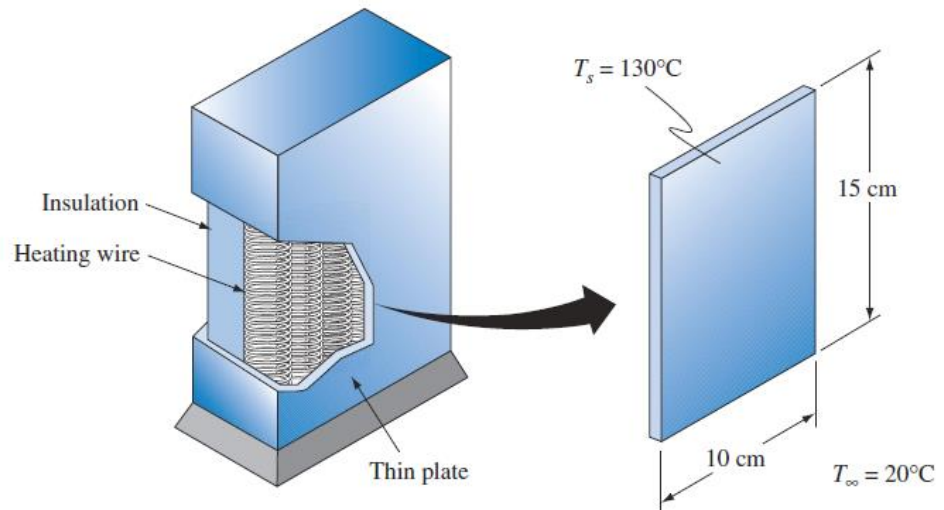
CH 9

- 1) An electrical room heater consists of a horizontal coil of electrical resistance wire, as shown in figure given below. Such a coil is to be tested at a low power that will result in a wire temperature of . Calculate the rate of convection heat loss per unit length from the wire, which is 1 mm in diameter. For the purposes of this calculation, the wire can be approximated as being straight and horizontal. Room air is at 27°C . Repeat the calculation for a test performed in a carbon dioxide atmosphere, also at 27°C .



- 2) The rating for the small vertical-plate resistance heater shown in Figure given below is to be determined. Estimate the electrical power required to maintain the vertical heater

surface at 130°C in ambient air at 20°C . The plate is 15 cm high and 10 cm wide. Compare with results for a plate 450 cm high. The heat transfer coefficient for radiation is $8.5\text{ W/m}^2\text{ K}$ for the specified surface temperature.



- 3)
Calculate the rate of convection heat loss from the top and bottom of a flat, 1-m square, horizontal restaurant grill heated to 227°C in ambient air at (see Figure)

