Reading Heat Through Two Insulating Layers

Base your answers on the information provided and your knowledge of chemistry. Use the 2025 Chemistry Reference Tables as needed.

An exhibit keeps one face of a two-layer panel at 60 °C and the opposite face at 20 °C. After the readings become steady, heat passes through both layers at the same rate. In the model the temperature drop through each layer equals the heat-transfer rate times that layer's thermal resistance. Ignore resistance at the joint and heat transfer through the side edges.

Layer	**Thermal resistance (°C/W)**
P	2
Q	6

1 At the same steady heat-transfer rate, which layer has the larger temperature drop?

(1) P

(2) Q

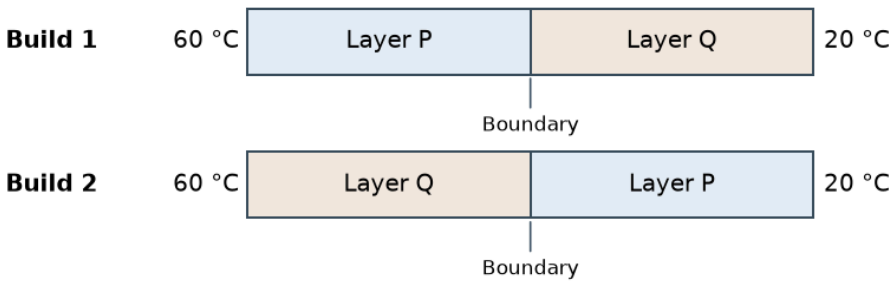
(3) Both have the same drop.

(4) The hotter face sets the drop in each layer to 60 °C.

2 Calculate the steady heat-transfer rate using the temperature difference across the whole panel. [1]

Answer and work

The exhibit rebuilds the panel with the layers in the opposite order. The diagram shows both builds. The layer resistances and both face temperatures stay the same.



The two layer orders between the same hot and cool faces.

3 Find the temperature where the layers meet in each build. [1]

Answer and work

4 A student sees a lower boundary temperature in the second build and says less energy crosses the panel each second. Evaluate the claim. [1]

Answer and work