The Meaning of $k$

**Quiz:** The meaning of $k$.
In the root beer cooling example the DE was:

$$\dot{x}(t) = k(T_{\text{ext}}(t) - x(t)).$$

What does it mean for $k$ to be large?

**Choices:**
1. good insulation
2. bad insulation
3. nothing to do with insulation

**Answer:**
When the insulation is good, $k$ is small; when the insulation is bad $k$ is large. When the insulation is perfect $k$ is zero.

$k$ is a coupling constant; when it is zero, the temperature inside the cooler is decoupled from the temperature outside. In the construction industry a number like $k$ is pasted on windows; it’s called the U-value of the window.