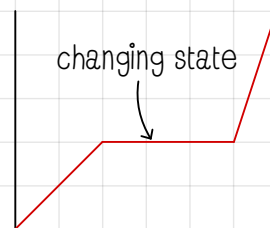


Specific latent heat



Latent means hidden, so latent heat literally means "hidden heat". This is because when an object changes state the temperature stays the same. This is shown by the flat section on a heating or cooling curve



Definition



The specific latent heat of a substance is the amount of energy required to change the state of one kilogram of the substance with no change in temperature.



The equation to calculate the energy required for a change of state is:

energy for a change in state = mass x specific latent heat or $E = mL$

↓
joules (J)

↓
kilograms (kg)

↓
joules/kilograms (J/kg)

You DO NOT need to learn this equation for the exam



The specific latent heat of fusion is used for a change of state from a solid to a liquid.



The specific latent heat of vaporisation is used for a change of state from a liquid to a gas.

Calculating energy for a change of state

2 kg of a liquid coolant freezes at -20°C . Calculate the energy required to change the state of the frozen coolant at -20°C to liquid coolant at -20°C . The specific latent heat of fusion for the coolant is 225 000 J/kg.

1. Use the equation $E = mL$

2. Substitute the values into the equation. $E = 2\text{kg} \times 225\,000\text{ J/kg}$

3. $E = 450\,000\text{ J}$ (or 450kJ)



The value for the latent heat of fusion can be used for a solid changing into a liquid or a liquid changing into a solid. The latent heat of vaporisation can be used for a liquid changing into gas or a gas into a liquid.