

Claim of a Heat Pump

An inventor claims to have a heat pump that absorbs energy from a cold space and transfers it to a warmer space. It supplies 2.5 kWh of heat energy to the warmer space for each kWh of electricity it consumes. Is this a reasonable claim and why?

Answer: Yes, this is reasonable for a heat pump.

Explanation: The claim is valid, this is reasonable for a heat pump. The coefficient of performance (COP) is 2.5. The first law of thermodynamics is not violated because the heat pump consumes work (electricity) to accomplish this task. Also, the second law of thermodynamics is not violated. The heat pump captures energy from a cold medium and carries it to a warm medium. It does not create it.