



## Heat Engine

1) Is it possible for a heat engine to operate without rejecting any waste heat to a low temperature reservoir? 2) Also, in the absence of any friction and any other irreversibilities can a heat engine have an efficiency of 100%?

Answer: 1) No, 2) No.

Explanation: 1) and 2) both no; both engines violate the Kelvin-Planck statement of the second law of thermodynamics. Also, reversible engines have to reject heat to a low temperature reservoir and can never have an efficiency of 100%.