

CHAPTER OVERVIEW

28: Power

Simply put, power is the rate of change of energy (or work) with time:

$$\mathcal{P} = \frac{dE}{dt} \quad (28.1)$$

In SI units, power is measured in units of watts (W), named for the Scottish engineer James Watt:

$$1 \text{ W} = 1 \frac{\text{J}}{\text{s}} = 1 \frac{\text{kgm}^2}{\text{s}^3} \quad (28.2)$$

In CGS units, power is measured in units of statwatts:

$$1 \text{ statwatt} = 1 \frac{\text{erg}}{\text{s}} = 1 \frac{\text{gcm}^2}{\text{s}^3} \quad (28.3)$$

The British engineering unit of power has no special name; it is simply a foot-pound per second (ft-lbf/sec).

Another common unit that is not part of the British engineering system is the horsepower (hp): $1 \text{ hp} = 550 \text{ ft} \cdot \text{lbf}/\text{sec}$, or about 745.7 watts. The power produced by an automobile engine is traditionally measured in horsepower. A few examples:

- Lawn mower: 5hp
- Smart car: 90hp
- Typical modern automobile engine: about 200hp
- 1967 Pontiac GTO “muscle car”: 360hp
- Semi truck (tractor): 500hp
- Modern farm tractor: 500hp
- Formula One engine used in a modern Indianapolis 500 race car: 700hp or more
- “Monster truck” (as seen at county fairs): 1500hp

[28.1: Energy Conversion of a Falling Body](#)

[28.2: Rate of Change of Power](#)

[28.3: Vector Equation](#)

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