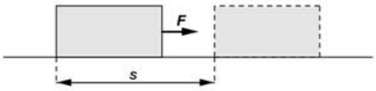
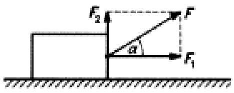
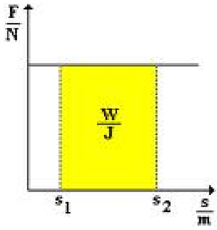
Mechanická práce a energie



$$\boxed{W = F \cdot s}$$



$$W = F.s.\cos\alpha$$



$$1J = 1kg.m^2.s^{-2}$$

mechanical work

mechanical energy

gravitational potential energy

efficiency

$$P = \frac{W}{t}$$ power $$W = P.t$$

Performance equals the work done in one second.

Power is marked by symbol P and its unit is watt (W).

$$P = \frac{W}{t} \quad (1)$$

$$P = \frac{W}{t} = \frac{F.s}{t} = F.\frac{s}{t} = F.v$$

$$P = F.v \quad (2)$$

$$[P] = \frac{[W]}{[t]} = \frac{J}{s} = J.s^{-1} = 1W = 1Watt$$

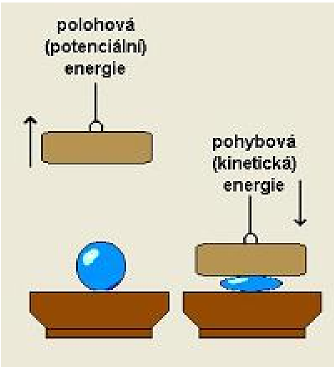
$$1W = kg.m^2.s^{-3}$$

$$\eta = \frac{W}{E}$$

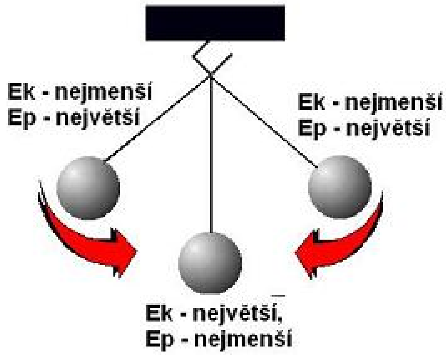
Efficiency is symbolised by a low-case Greek letter eta.

$$\eta = \frac{P}{P_0}$$

equipment efficiency defined as the ratio of performance and power



mechanical power



kinetic energy

law of energy conservation

gravitational potential energy of the mass is directly proportional to the height to which the body was lifted

$$E_p = m.g.h$$

kinetic energy of the mass is directly proportional to the square of its velocity

$$E_k = \frac{1}{2} m.v^2$$

The mechanical processes taking place in an isolated system of bodies is a total mechanical energy E constant

$$E = E_k + E_p = konst.$$

Výkon Mechanická práce

Mechanická energie Účinnost

Kinetická energie Potenciální tíhová energie

1 W 1 J 1 J 1 J 1 J %

$$P = \frac{W}{t}$$

$$E_k = \frac{1}{2} m.v^2$$

$$E_p = m.g.h$$

$$E = E_k + E_p = konst.$$

$$\eta = \frac{W}{E}$$

$$W = F.s.\cos\alpha$$

kinetic energy efficiency mechanical energy power

gravitational potential energy mechanical work