Answer on Question #40872, Physics, Molecular Physics | Thermodynamics

How many kg of coal are used to supply 1500 Watts to heat a barn for 7 hours? The energy content of coal is 19 x 10^6 J/kg.

Solution:

The heat of combustion ΔH is the energy released as heat when a compound undergoes complete combustion

$$\Delta H = qm$$

where q = 19 x 10^6 J/kg is the energy content of coal.

The power is

$$P = \frac{\Delta H}{t} = \frac{qm}{t}$$

Thus,

$$m = \frac{Pt}{q} = \frac{(1500 \text{ W}) \cdot (7 \cdot 3600 \text{ s})}{(19 \cdot 10^6 \text{ J/kg})} = 1.99 \approx 2 \text{ kg}$$

Answer. 2 kg.