A small oxygen tank at a Guage pressure of 125 atm has a volume of 6.88l at 21.0 degree Celsius. If an athlete breathes oxygen from this tank at the rate of 8.50 liter per minute when measured at atmospheric pressure and the temperature remains constant at 21.0 degree Celsius how long will the tank last before it is empty?

Find: t – ?

Given:

p_1=125 atm

V_1=6,88 L

V_0=8,5 L/min

p_2=1 atm

Solution:

Isothermal process (T = const).

$p_1 V_1 = p_2 V_2$ (1)

Of (1) $\Rightarrow V_2 = \frac{p_1 V_1}{p_2}$ (2)

Of (2) $\Rightarrow V_2$=860 L

$t = \frac{V_2}{V_0}$ (3)

Of (3) $\Rightarrow$ t=101 minute

Answer:

101 minute