

The area A of the tunnel is calculated using the formula for the area of a circle:

$$A = \pi \left(\frac{d}{2} \right)^2 \quad (1)$$

where d is the diameter of the tunnel.

The effective power P_{eff} is the product of the power P and the efficiency η of the propeller:

$$P_{\text{eff}} = P \cdot \eta \quad (2)$$

The velocity v of the air in the tunnel is calculated using the formula for the power of wind, rearranged to solve for v :

$$P = \frac{1}{2} \rho A v^3$$
$$v = \left(\frac{2P_{\text{eff}}}{\rho A} \right)^{\frac{1}{3}} \quad (3)$$

where ρ is the air density, assumed to be 1.2 kg/m^3 at sea level and 20°C .