

$$E_k = \rho \pi U_{\max}^3 \int_0^R \left(\frac{y}{R} \right)^{3/7} (R-y) dy \quad y^{10/7}$$

$$= \rho \pi U_{\max}^3 \left[R^{4/7} \cdot \frac{7}{10} y^{10/7} - R^{7/7} \cdot \frac{7}{17} y^{17/7} \right]_0^R$$

$$= \rho \pi U_{\max}^3 \left(\frac{7}{10} R^2 - \frac{7}{17} R^2 \right) = \rho \pi U_{\max}^3 \times \frac{49}{170} R^2 = \pi R^2 \cdot \frac{49}{60} U_{\max} \times U_{\max}^2 \cdot \rho \cdot \frac{60}{170}$$

$$e_k = \frac{E_k}{\rho Q} = \frac{60}{170} \cdot U_{\max}^2 = \frac{60}{170} \times \left(\frac{60}{49} \right) \bar{u}^2 = \frac{1.06}{2} \bar{u}^2 \quad (6)$$