

The volume mean wake fraction at radial position,  $x (=r/R)$  is given by:

$$\omega(x) = \frac{\int_0^{2\pi} \omega(x, \theta) \cdot x dx}{\int_0^{2\pi} x dx} = \frac{1}{2\pi} \int_0^{2\pi} \omega(x, \theta) dx$$
$$= \frac{1}{\pi} \int_0^{\pi} \omega(x, \theta) dx$$

The nominal mean wake fraction is given by:

$$\omega = \frac{\int_{x_h}^{1.0} \omega(x) \cdot 2\pi x dx}{\int_{x_h}^{1.0} 2\pi x dx} = \frac{\int_{x_h}^{1.0} \omega(x) \cdot x dx}{\frac{1}{2}(1-x_h^2)}$$