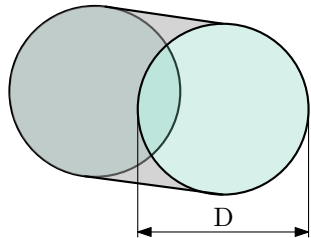
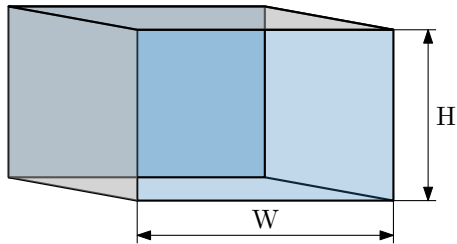


circular duct



$$P_{w_o} = \pi D \quad \rightarrow \quad L_{c_o} = D$$

rectangular duct



$$P_{w_{\square}} = 2H + W \quad \rightarrow \quad L_{c_{\square}} = \frac{2HW}{H+W}$$