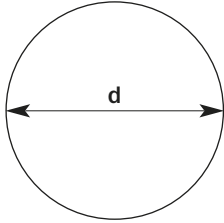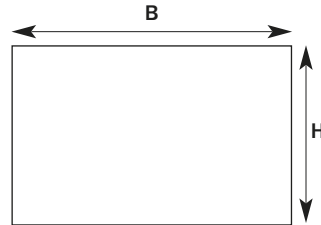# Duct- and sewer frictional loss

1. Calculation of the frictional pressure loss

$$\Delta pv = \lambda \cdot \frac{L}{d} \cdot \frac{\rho}{2} \cdot w^2$$

$$\Delta pv = \lambda \cdot \frac{L}{d_h} \cdot \frac{\rho}{2} \cdot w^2$$

$$d_h = \frac{L \cdot B \cdot H}{B + H}$$

2. Parameters

p = Pressure loss

 = coefficient of duct friction (VENTAFLEX® GRP coating ...)

L = duct length in [m]

d = diameter respectively dh = hydraulic diameter in[m]

 = air density in [kg/m³]

w = flow velocity in [m/s]

3. Comparison of the pressure losses

Round and oval air ducts are clearly more streamlined than square air ducts. Thus round air ducts have 20% less surface than square channels with the same performance.
Due to lower pressure losses a small fan can be used. When installing VENTAFLEX® air ducts round or oval operating costs are sustainably saved.

Comparison: Form of the duct and pressure loss

Circumference		Form		Pressure loss
	100 %	●	100 %	
	103 %	⬬	106 %	
	119 %	▬	128 %	

Influence of the duct form on material consumption (weight/ statics) and pressure loss
(energy consumption/ operating costs) at the same cross-section area