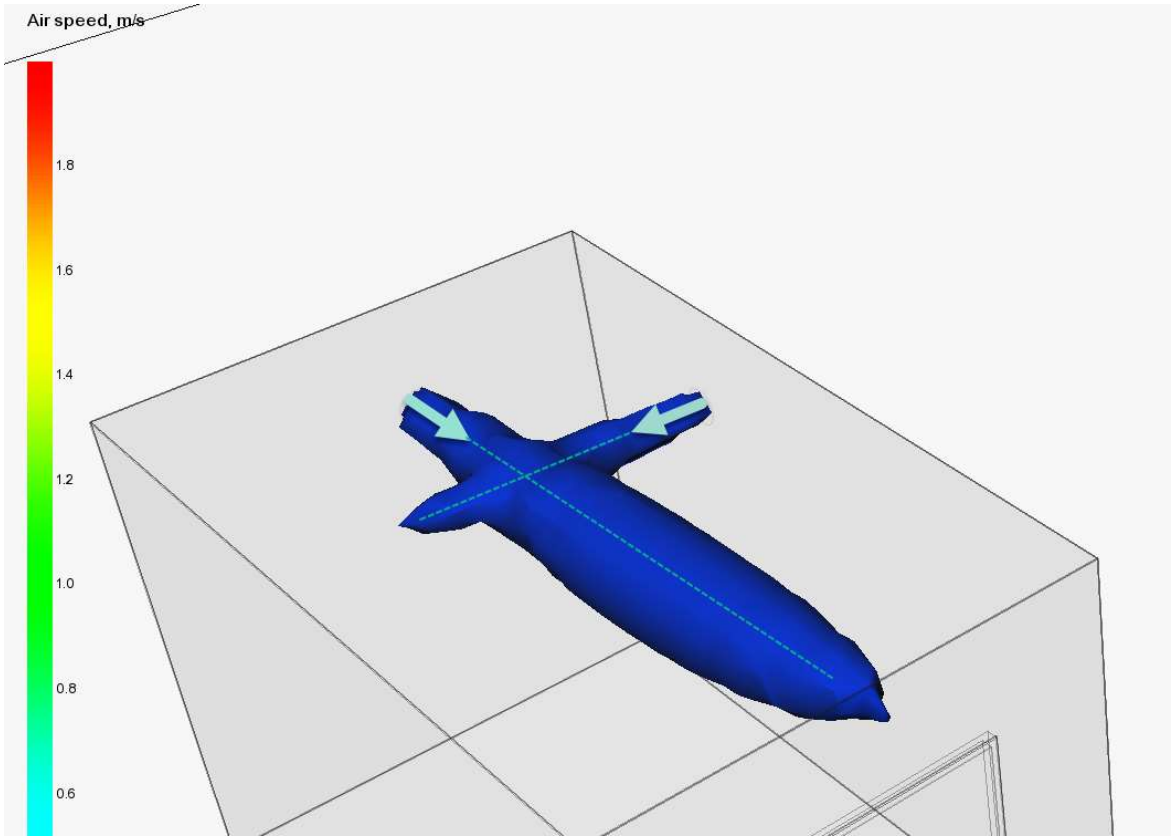
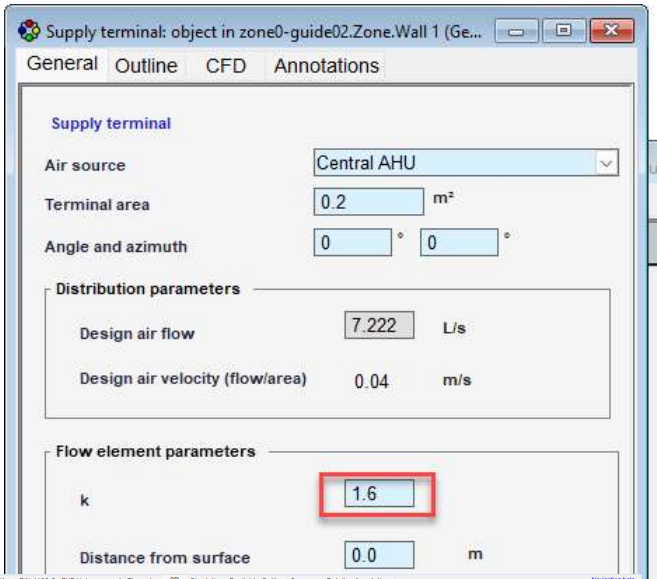
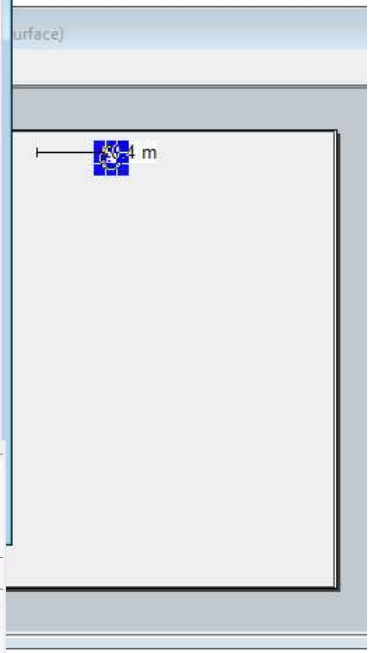
Air Jets

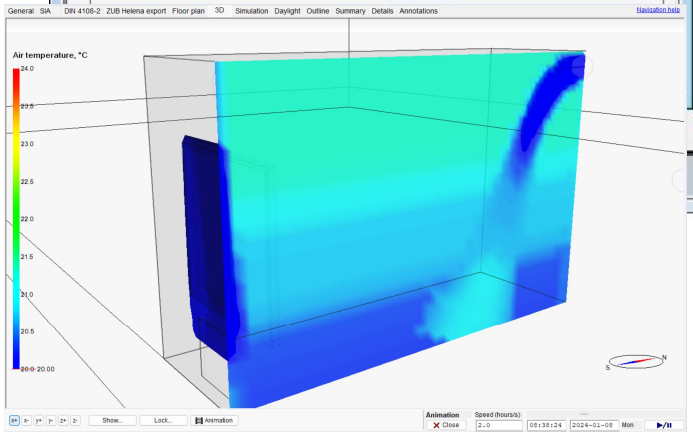
- At air supply terminals
- Multiple jets don’t interact!



Air Jets







- Created at supply terminals
- Terminal area and design air flow rate influence the design air velocity
- The k-value influences the «throw distance» of the jet
- The smaller the k-value, the faster the mixing of the jet with the room air and the lower the jet flow velocities.
- $v(x) = \frac{k \cdot \sqrt{A_0}}{x} \cdot v_0 = \frac{k}{x \cdot \sqrt{A_0}} \cdot Q_0$

x: Distance from jet start
v(x): Velocity at x
v_0: Velocity at jet start
A_0: Area of supply terminal
Q_0: Air volume flow at jet start

EQUA

Recommendations for k-values



- Round nozzles: 7
- Rectangular free area: 6
- Slot: 5
- Perforated plate: 3 for small and 4 for big holes
- Sloted plate: 2 for transverse, 5 for straight bars

EQUA

IX. Calculation of parameter K from measurements

- Some manufacturers specify a flow width $\mathbf{L_x}$ of the center jet from measurements for their supply air terminals, at which the flow velocity is still a given value $\mathbf{v_x}$.
- These corresponding variables $\mathbf{v_x}$ and $\mathbf{L_x}$ apply depending on the specific outlet opening $\mathbf{A_0}$ and an outflow velocity $\mathbf{v_0}$ of the supply air terminal.

- From these measured values and geometric data, the corresponding parameter K can be calculated as follows:

$$K = \frac{v_x}{v_0} \cdot \frac{L_x}{\sqrt{A_0}}$$

with A_0 = Outlet opening
v_0 = Outflow velocity
L_x = flow distance measured (e.g. throw distance $L_{0,5}$), belonging to
v_x = defined flow velocity (e.g. 0.5 m/s)

- Although the above equation strictly only applies to supply air terminals with circular cross-sections, it often provides very good approximation values for rectangular openings, which are sufficiently accurate for structural engineering issues.