

User Manual

## Analytical System AeroSet

Getting Started

## **Quick Start**

Let us consider an example of designing a ventilation schema from scratch. Usually, there is an image file with airways and measured air quantities and pressure drops.



In that case, that file can be added to AeroSet with the *Add Image* command on the *View* ribbon tab.

File	Home	View	Display	Schema		Ventilatio	n	Heat				
Turn Off Areas			<ul> <li>↓</li> <li>↓</li></ul>	Pan	Show All	Zoom In	Zoom out	Search	Print Area	Backg	round	All Layers
		Areas				Act	ions			+	Add Ir	nage
<ul> <li>Mir</li> </ul>	ne Sections		•							÷	Edit	
<b>8</b> 🖷 A	dd Section 🚔	Display 🔻 🕇	Report 🖕							Î	Delete	All

As a result, the image will be displayed inside the empty area of the main window.



Then a user can add some airways drawing them over the ones visible on the background image. This can be done by the *Add Airway* command on the *Home* ribbon tab.



Creating an airway is performed by clicking at such places where the nodes of the airway should be. If a new end node is placed over the end node of existing airway, then these two airways are connected.



When the network is created, a user should set aerodynamic resistances of airways. In our case they are defined be measured air quantities and pressure drops. Therefore, a user should select each airway and open its properties panel either by the *Edit* command on the *Home* ribbon tab, or by double clicking on the airway.



On the *Ventilation* tab, a user can specify that the airway resistance be defined by a ventilation survey and set the measured air quantity and pressure drop.

Aerodynamic I	Resistance		
Defined:	By survey		
Quantity:	216 m3/s		Q=216. dP=908
Pressure drop:	Manually defined		
ΔΡ:	908 Pa	1	

When all aerodynamic resistances are specified, the background image can be hidden by the *Background* command on the *View* ribbon tab.



Then a user should indicate which end nodes are connected to the atmosphere by setting the corresponding checkbox on the properties panel of these end nodes.

•	Properties	•	
ents Parameters	Physical Coordinates Elevation Z: Coordinate X:	0 m -147 m	
Measureme	Coordinate Y:	127 m	
Indicators	Air temperature: Connection with the atmosphere:	20 °C	

In order to complete the ventilation design, a user should add a fan by clicking on an item of the same name in the equipment gallery on the *Home* ribbon tab and then clicking on some airway.

File	Home	View	Display	Schema	Ventilation	Heat
Add Airway •	Split Airway - Sche	ema Objects			A A A A A A A A A A A A A A A A A A A	■

A simple model of fan is used by default when the fan pressure is constant whatever the air quantity.

•	Properties	•	
Common	Fan Properties Model: Simple	<b>_</b>	
ation	Pressure:	600 Pa	
Ventil	Efficiency:	65 %	$\otimes$
ors	<ul> <li>Calculated Parameters</li> </ul>		

If there is a need to simulate some specific fan model, then this model should be imported into the list of fans on the *Ventilation* ribbon tab.

Ventil	lation H	eat									
	·\$		U	0/	×			*		$\int$	
stimate	Check For	Create	Measure	Measure	Export	Save		-	Fans	Airway	Permeabilities
eviations	Recirculation	Pressure Chart 🕶	Pressure Drop	Power Input	to Excel	Airflow			•	Types 🕶	•
Calculation	n		Results				Ventilation Modes Dictionaries			aries	

₩ Fan Templates			- 0	×
Display Name	Diameter	Min Speed	Max Speed	
				*
Import Fan Create Fan			ОК	
<ul> <li>Image Fans</li> <li>Image Fans</li> <li>All cate</li> <li>All cate</li> <li>All cate</li> <li>All cate</li> <li>CFT ME1-212XD-VHR</li> <li>FlaktWoods</li> <li>FlaktWoods</li> <li>Howden 170WZ+4EME</li> <li>Howden 280LY+4HME</li> <li>Howden 280LY+4HME</li> <li>Howden 400XZ+4HKE</li> <li>Howden 530YY+9HKE</li> <li>Korfmann (d)AL 17 - 1600</li> </ul>	egories	- [	Cancel	
				~
Display Name	Diameter	Min Speed	— ⊔ Max Speed	X
►     Howden 170WZ+4EME       Blade Angle     Reversal       Speed     2400       •     -24 °       1450 rpm     1450 rpm       •     -12 °       1450 rpm     1200       •     -6 °       1450 rpm     600	1,7 m	0 rpm 400- ₹ 300- 200- 100-	1450 rpm	

When fan templates are imported, their templates can be selected on the fan properties panel.

Ì

Add Curve

Ŧ

1450 rpm

6 °

Howden 280LY+4HME

Import Fan

Create Fan

•

30 60 90 120 15

2,8 m

Air Quantity, m3/s

30 60 90 120 15

Air Quantity, m3/s

0 rpm

980 rpm 🏾 🃋

ОК

•	Properties	•	
Common	Fan Properties Model: Detailed		ſ
Ventilation	Template: Howden 170WZ+4EMi ▼ Blades: Angle of -24° ▼		$\otimes$
Indicators	Speed: 1450 rpm from 0 to 1 450 rpm In parallel: 1		
	Installation: Inside a wall		

Finally, a user can start the simulation by the *Simulate Airflow* command on the *Ventilation* ribbon tab.

_	Schema	١	Ventilation		
	<u>→</u> //	<u>e</u>	/	<u>`</u>	
	Simulate Airflow <del>•</del>	Estima Deviatio	te C ons Re	Check For circulatior	n
1		Calcu	lation		

As a result, each airway will receive a calculated air quantity, which is displayed on the airway properties panel.

ameters	Calculated Para
0,0184 N.s2/m8	Resistance:
34,7 m3/s	Quantity:
3,5 m/s	Air velocity:
0 %	Deviation:
-27 Pa	ΔΡ:
772 W	Power cost:

However, there is a more convenient way to display the calculation results by enabling the air quantity indicator on the *Display* ribbon tab.





A duty point is displayed on the fan properties panel. If the duty point is not located in a working range of air quantities, then it is painted in red.

