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WING JETTER SYSTEM

An Epoch-making Ventilator Achieved by Application of Wing Theory

Wing Jetter System - An Ecofriendly Ventilator Employing the Wing Theory

Ventilation system is roughly classified into two:
natural ventilation type (louver) and forced ventilation type (electrical fan).
The natural draft type is advantageous in that it is economical and does not generate noises.
But it involves a problem of backflow where there is a high wind.
The forced ventilation type, on the other hand, is rather expensive and involves problems of noises and vibrations while it does not cause backflows.
Each type has advantages and disadvantages, troubling those who design about which type they should choose.

HASEC Wing Jetter System is a practical application of the wing theory, while making use of the advantages of natural ventilation (low cost and noiseless).
The system efficiently utilizes wind energy which is an inexhaustible and infinitely sustainable form of energy available on the roof of any building.
The Wing Jetter System was successfully developed by HASEKO Corporation with the cooperation of the technical laboratory of Sakamoto Inc., a dedicated ventilator manufacturer, under the guidance and supervision of Prof. M. Ishihara, D.Eng., Kyoto Institute of Technology.
It is a revolutionary ventilating system that increases its exhaust capacity in proportion to wind velocity.

About 8,000 units (covering about 100,000 households) of Wing Jetter System have already been delivered to customers since its launch 25 years ago.
So far, we have received not a single complaint from users (noises, backflows, etc.), positively proving its superiority.
The Wing Jetter System is in service in plants, public facilities, and households.
In recent years it is particularly acclaimed for retrofitting in renovated condominium buildings.

- Ecofriendly
- Noiseless
- Energy-saving
- About 8,000 units in service
  (covering about 100,000 households)

WING JETTER SYSTEM

Economical, Energy-saving Ventilating System using Wind Energy Benefits

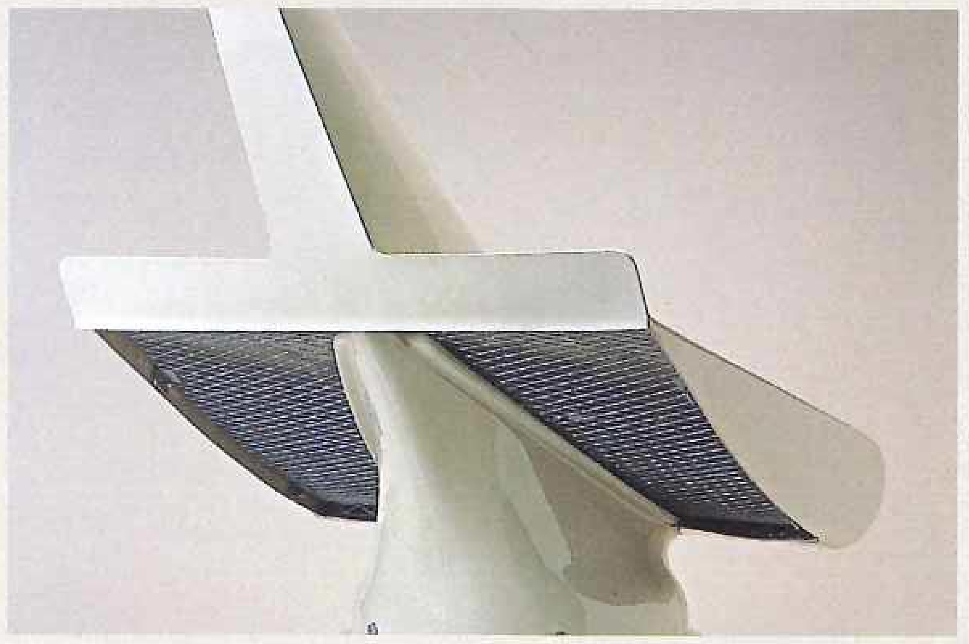
Revolutionary ventilating system

The naturally forced draft fan has posed a drawback of backflow when there is a high wind, although it is more advantageous than the mechanically forced one, in that it is economical and generates little noises. HASEC Wing Jetter System has cleared the drawback of backflow and other minor problems that so far remained to be solved in the natural ventilation system. Although launched 25 years ago, it still is an innovative ventilation system that efficiently utilizes clean wind energy and revolutionizes the conventional concept of a ventilator.

Floral Life and Culture Center

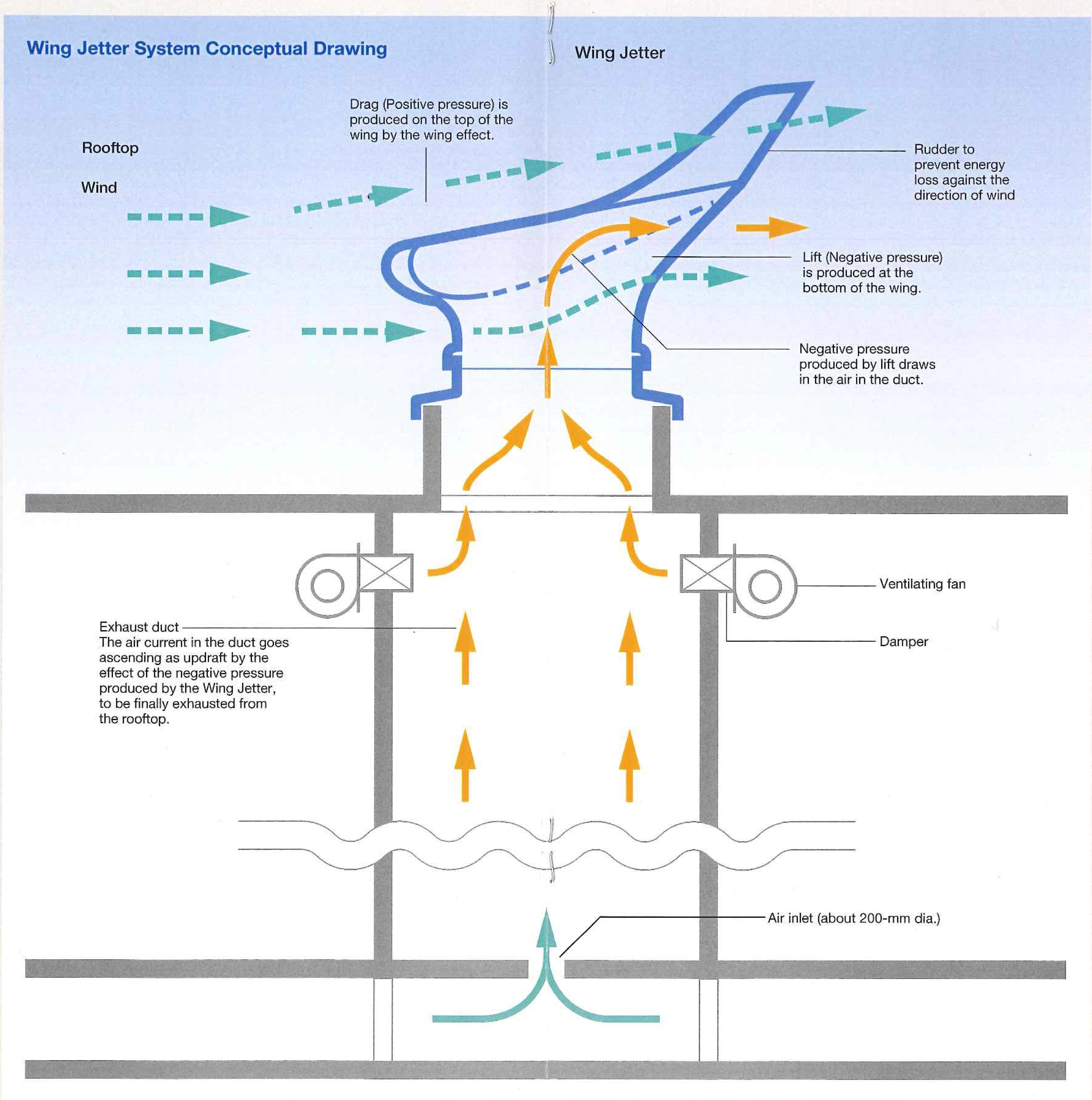
Overwhelming performance

HASEC Wing Jetter System is simply designed to use wind energy which is an infinitely sustainable form of energy always available on the roof of any building. Therefore, it can be installed at a reduced cost and requires little running cost. Design of the system based on the wing theory allows it to generate a high exhaust capacity even with a slight wind, increasing the capacity in proportion to wind velocity. Its performance is really overwhelming, still is available at low cost. Additionally, the system is very durable as its body is made of FRP.



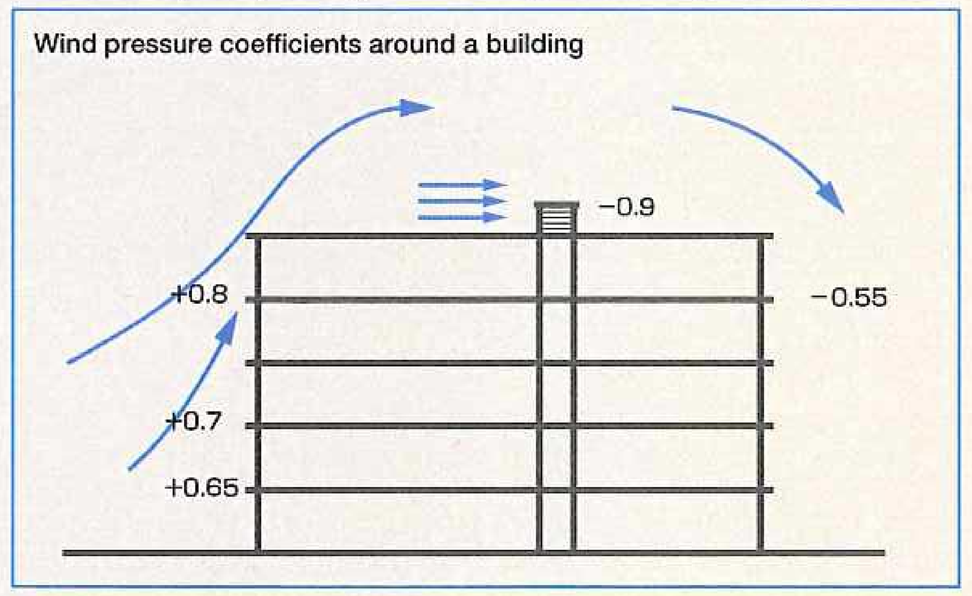
Ecofriendly

Unlike a motor-operated fan which is usually prone to noises and vibrations, the Wing Jetter System does not involve problems of noises and vibrations at all because it is powered with wind energy exclusively. In the perspective of energy consumption, it is the most environment-friendly ventilating system currently available on the market. Since its launch 25 years ago, about 8,000 units of Wing Jetter System have already been delivered and installed, covering about 100,000 households. So far, we have received not a single complaint from users, such as noises, backflows, etc. This fact proves that the purpose of its development design has been perfectly achieved.

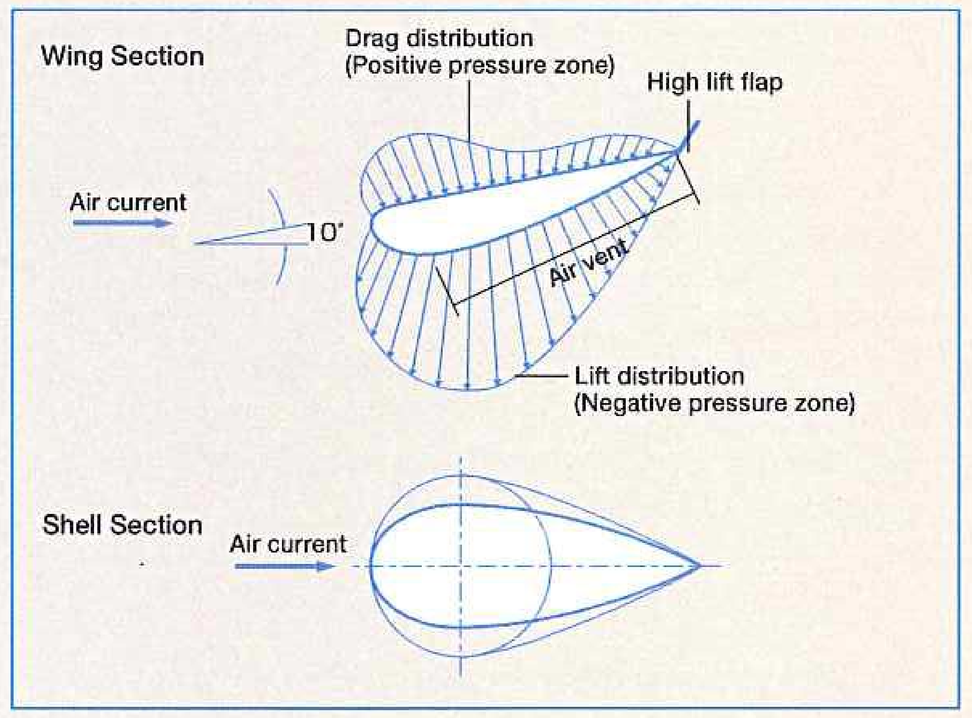


Wing theory of the system

When outside air current works on a building, its rooftop comes under negative pressure, decelerating the wind velocity. Supposing that there are local horizontal currents, the ventilator effect can be utilized. The illustration below shows the wind pressure distribution when the wind works on a building. The front of the building comes under positive pressure, and its back and rooftop under negative pressure. It has been proven that pressure is lowest on the rooftop. As air moves from areas of higher pressure to areas of lower pressure, if an air vent is provided in the room, the room air current flows toward the rooftop through the duct. A natural draft tower using a four-side louver does not always accomplish this (utilization of negative pressure on the top of the roof). The Wing Jetter System has been developed by taking full advantage of the wing theory.

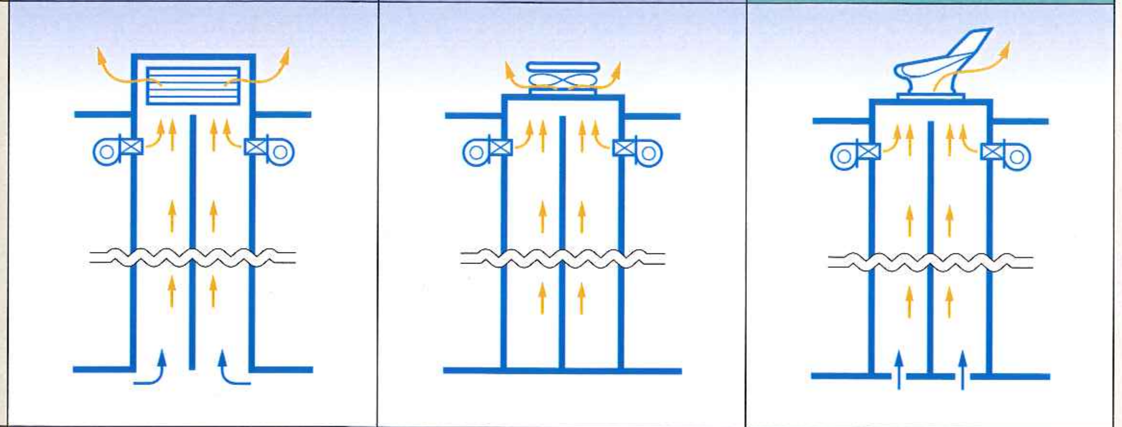


The Jetter wing has a streamline airfoil section to enhance the ventilating effect as this form of section maximizes smooth passage of outside air currents and the wind resistance of the body. When an air current works on the wing from the front face, drag (positive pressure) and lift (negative pressure) are produced in the wing. The Wing Jetter System makes the most of this lift. By combining this lift with the wing flap effect, the system puts the room under negative pressure to promote ventilation. The Wing Jetter System has won the highest praise in the industry as a break-through ventilator.



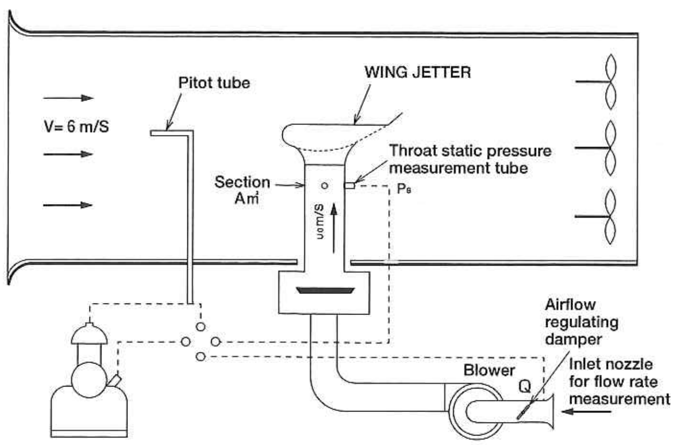
Matsukaze Hospital, Chuo City, Shikoku

Wing Jetter System Conveniently Combines Advantages of Natural and Forced Ventilation Systems

Ventilation system	Centralized forced ventilation (PULL)	Centralized negative pressure ventilation (P-P)	Wing Jetter System
Classification			
Durability	◎	△	◎
Noise	Noiseless	45-60 phons (at the top floor)	Noiseless
Appurtenant work	—	Electrical and noise suppression works	—
Running cost	Not required	Required	Not required
Features	Use of individual unit available Trouble-free No running cost required Noiseless, vibration-free Backflows to vacant rooms Exhaust capacity decreases according to the wind velocity on the roof.	No backflows occur; hygienic Continuous operation required Generates noises/vibrations. Prone to trouble	No backflows occur; hygienic Use of individual unit available Noiseless, vibration-free Low installation cost

●Wind Tunnel Test for Assessment of the Wing Jetter System Performance and Test Data

Testing Device (Linear Wind Tunnel Tester)

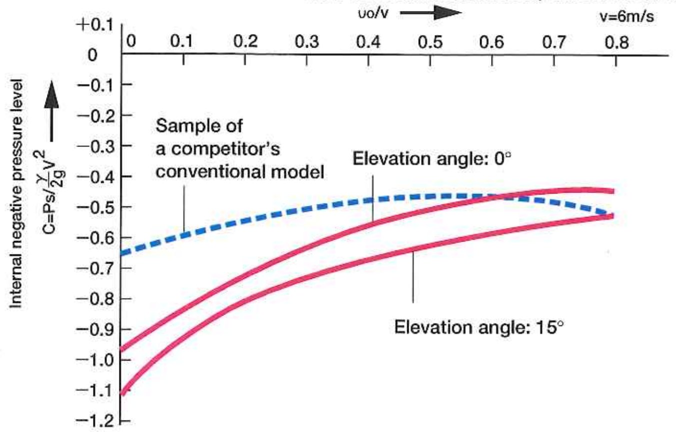


Wind Tunnel Test Data

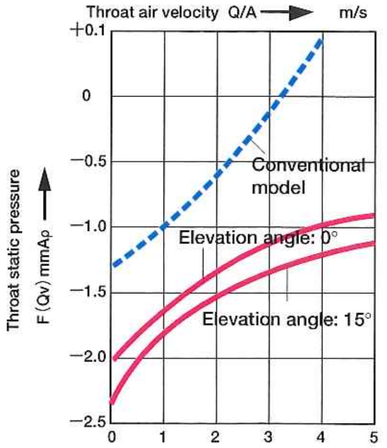
Elevation angle	Throat static pressure Ps	Flow rate Q	Throat air velocity $υ_0$	$C=Ps/\frac{\gamma}{2g}v^2$	υo/v
(Horizontal) Air temp. 36.6℃	-1.97	0	0	0.96	0
	-1.73	1.46×10^{-2}	0.61	0.84	0.10
	-1.57	2.54×10^{-2}	1.06	0.77	0.18
	-1.18	4.99×10^{-2}	2.08	0.58	0.35
	-1.07	7.50×10^{-2}	3.13	0.52	0.52
	-0.94	9.91×10^{-2}	4.13	0.46	0.69
	-0.90	11.14×10^{-2}	4.64	0.44	0.78
(15°) Air temp. 32.8℃	-2.33	0 0	0	1.11	0
	-1.90	1.46×10^{-2}	0.61	0.90	0.10
	-1.78	2.52×10^{-2}	1.05	0.85	0.17
	-1.45	4.94×10^{-2}	2.06	0.69	0.34
	-1.34	7.44×10^{-2}	3.10	0.64	0.52
	-1.20	9.82×10^{-2}	4.09	0.57	0.68
	-1.12	11.11×10^{-2}	4.63	0.53	0.77

●Characteristic Performance Curve of the Wing Jetter System

Characteristic Performance Curve



Characteristic Performance Curve



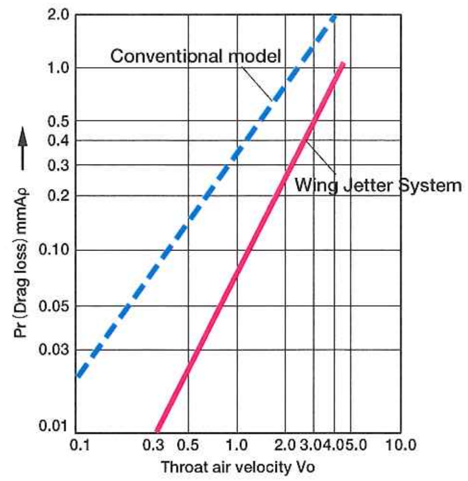
Elevation angle = (Inclination of the wing relative to the direction of wind)/Ps = (Throat static pressure (mmA ρ))/Q = (Flow rate when force-fed by blower (m/sec))/υo = (Throat air velocity (m/sec))/ v = (Air velocity in the wind tunnel (6m/sec))/c = (Ratio between throat static pressure and wind tunnel velocity pressure)/ζo = (Drag coefficient)/α = Flow coefficient

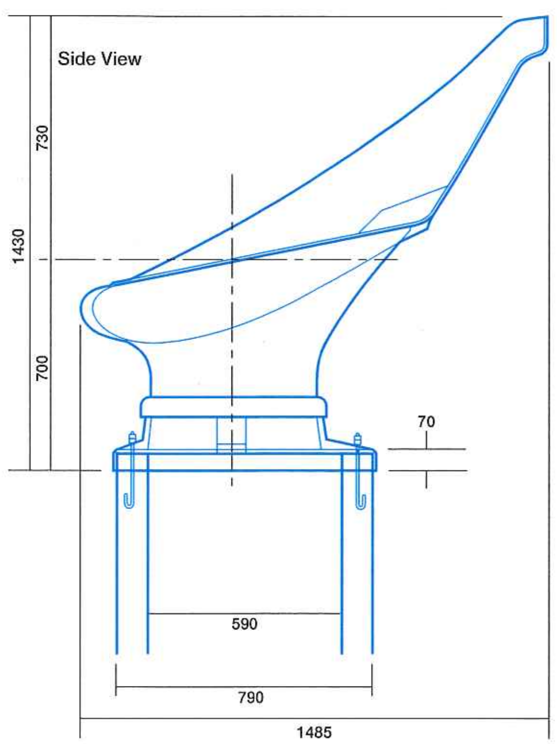
●Loss Pressure Characteristics of the Wing Jetter System

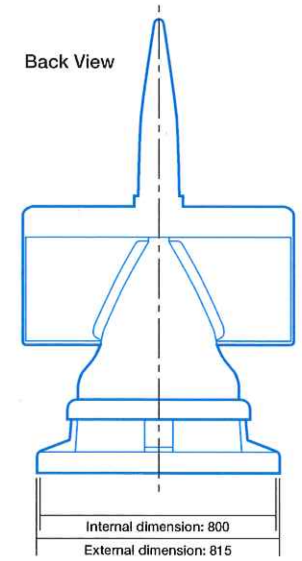
Drag Coefficient Measurement Data

Elevation angle	Flow rate Q	Throat air velocity Q/A (m/sec)	Pressure difference △p	ζo	α
(Horizontal) Air temp. 36.1℃	1.48×10^{-2}	0.61	0.03	1.37	0.854
	2.42×10^{-2}	1.01	0.08	1.37	0.854
	4.92×10^{-2}	2.05	0.25	1.04	0.981
	7.44×10^{-2}	3.10	0.53	0.96	1.021
	9.88×10^{-2}	4.12	0.93	0.95	1.026
	10.88×10^{-2}	4.53	1.13	0.96	1.021
(15°) Air temp. 32.8℃	1.48×10^{-2}	0.61	0.03	1.37	0.854
	2.42×10^{-2}	1.01	0.07	1.20	0.913
	4.93×10^{-2}	2.05	0.25	1.03	0.985
	7.45×10^{-2}	3.10	0.55	0.99	1.005
	9.87×10^{-2}	4.11	0.93	0.96	1.021
	10.73×10^{-2}	4.47	1.14	0.99	1.005

Loss Pressure Characteristics



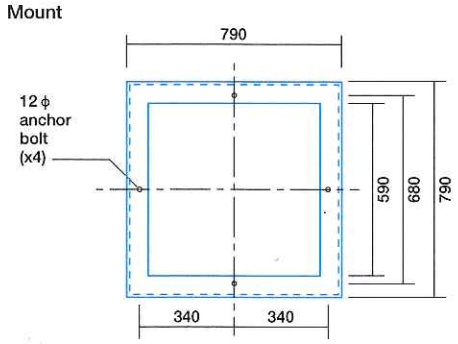




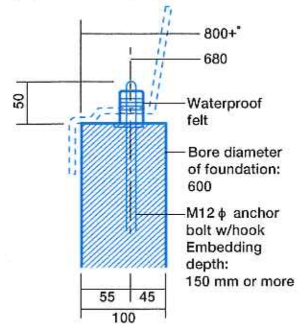
Dimensional Drawing

Height: 1,430mm
Width: 950mm
Depth: 1,485mm
Material: FRP Body
Weight: 50kg

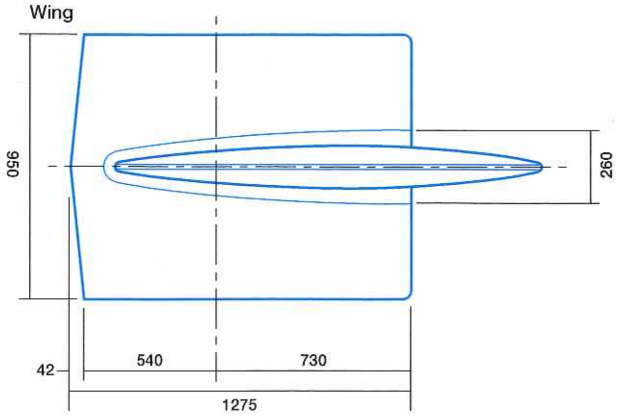
Mount



Anchor Embedding Work (Typical example)



Wing



Instructions for Anchor Embedding Work

1 Be sure to provide an air inlet (about 200-mm dia.) at the bottom of the exhaust duct.
ⓐThis is required to promote ventilation by the effect of draft even during a flat calm.
ⓑUnderfloor ventilation can be expected for double flooring.

2 Install the system 3 meters away from the wall where there is a setback, penthouse or in similar areas where there is a wind pressure zone.

3 Provide anchor bolts with rust preventive treatment after mounting.