DeAL - Facade Integrated Ventilation Systems Evaluation
Results from 12 Buildings in Operation

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What are Facade Integrated Ventilation Systems?
Facade Integrated Ventilation Systems are ...

... ventilation units with acoustic insulation integrated into the outer shell of a building which transport by the shortest route supply air into the room and / or extract air from the room ...
More and more features in the building envelope - A continuous trend

Basic features

• Thermal insulation
• Weather protection
• Safety barrier
• Sun-blind
• Daylight control
• Natural ventilation

Potential features

• Lighting
• Pipe work
• Energy generation (photovoltaic)
• Energy storage
• Heating
• Mechanical ventilation
• Fresh air filtering
• Air conditioning
More and more features in the building envelope - The key benefits

- Reduction of structural height

- Natural thermal cooling and concrete core activation

- Often the only possible way for refurbishments
More and more features in the building envelope - The key benefits

- Off-site prefabrication
- Plug & play installation
- Maximum flexibility in utilization and layout
- High space efficiency

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The art of handling air
Energy efficiency

Indoor climate / comfort

- EN ISO 7730
- EN13779
- EN15251
Benefits of Green Building

Environmental benefits:
• Enhance and protect ecosystems and biodiversity
• Improve air and water quality
• Reduce solid waste
• Conserve natural resources

Economic benefits:
• Reduce operating costs
• Enhance asset value and profits
• Improve employee productivity and satisfaction
• Optimize life-cycle economic performance

Health and community benefits:
• Improve air, thermal and acoustic environments
• Enhance occupant comfort and health
• Minimize strain on local infrastructure
• Contribute to overall quality of life
More and more features in the building envelope - The key benefits

- Low operational costs by means of load dissipation with water and minimized air distribution energy

- High savings potential due to cut-off during non service periods

standard specific fan power (SFP) 1500 – 3000 W/(m³/s)

specific fan power (SFP) previous: 600…1400 W/(m³/s)
now: 250…600 W/(m³/s)

Limit value according to EN 13779:
SFP4 = 1250…2000 W/(m³/s)

- High degree of acceptance by the user owing to individual adjustment and windows that can be opened
Cheaper than expected!

Just...
- Change the filter
- Clean the condensate tray if necessary
- Control the functions

Save on...
- Cleaning the whole ductwork
- Control all the fire dampers
- Shutting down the whole ventilation system for hours

Maintenance cost are on the same level!
(compared to a central ventilation system)
Designs

Classic perforated façade

Sill element-façade

Element-façade with floor to ceiling glazing

Multifunctional element-façade
Decentralized air supply through underfloor/sill units with fan – central extraction of exhausted air

Concept 1

Outside
Office
SUP
ODA
Underfloor unit

False floor

Central extract air

Office Hall

ETA

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Decentralized air supply and transport of extract air with underfloor / sill units with two fans

Outside

EHA

ODA

Supply / extract air unit with heat recovery

Office

Hall

False floor
Open Space Offices

Perimeter zone with decentralized ventilation units of different configurations
Core with air-water-systems – e.g. ComBeam
Decentralized ventilation technology is not recommended for:

- Rooms with a required constant relative air humidity
- Clean rooms
- Rooms with high people frequency and low facade space
- Inside rooms and rooms with room depths > 6 m
Capricorn in Düsseldorf - An excellent example for a façade integrated design
Laimer Würfel in Munich - A brilliant example for modular design

Modular design consisting of module casing, function box, thermal switch and coil unit
Lighttower in Frankfurt - A brilliant example for a refurbishment