

CASE STORY

Personalised ventilation improves indoor air quality on the Jyske Bank dealer floor



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Employee dissatisfaction with indoor air quality

A workplace assessment for the dealer floor carried out a few years ago uncovered great general dissatisfaction among employees with the indoor air quality. The complaints revolved around drafts and high temperatures.

"A dealer floor is often a stressful environment, with a high heat load from countless computer screens. Our large screen on the back wall contributes approx. 15 KW/hour alone" explains Kent Sørensen, Operations Engineer at Jyske Bank in Silkeborg, Denmark.

"We have significantly increased the number of employees on our dealer floor at Jyske Bank compared to our original plans, with the result that they sit in close proximity to each other in a relatively crowded room with a high ceiling. My challenge as an experienced ventilation engineer was to remove the huge heat load and add a high volume of fresh outdoor air without creating unpleasant drafts for employees, all of whom are working under pressure in a sedentary occupation", adds Kent Sørensen.



A variety of ventilation solutions trialed

A number of different ventilation solutions have been tried over the years.

In order to eliminate uncomfortable drafts, various methods for controlling supply air have been used – from interval management to partial employee control over supply air vents. The Bank also experimented with various supply air vent designs, but nothing alleviated the drafts.

"We also attempted to use floor cooling at one time. This allowed us to remove some of the heat while also reducing air replacement – but a temperature difference of up to 3°C between the floor and head height reduces the effectiveness of the solution. A combination of floor cooling and mixed ventilation helped to some extent, but was not enough", explains Kent Sørensen.

"We then attempted to work out a solution together with an external consultant, in which we installed displacement diffusers in the room. However, the layout of the room made this solution difficult to implement, as employees would have ended up sitting far too close to the displacement diffusers, again exposing them to drafts.

"We reached the point where we had run out of ideas, and simply had to tell employees they would need to live with the discomfort", concludes Kent Sørensen.

Personalised ventilation leads to greater employee satisfaction

Then Jyske Bank discovered the new Personalised Ventilation (PV) system. This system revolutionises ventilation, as the personal ventilation units deliver fresh outdoor air directly in the vicinity of the user as a gentle breeze.

PV allows employees to directly control the speed and direction of the clean outdoor air. This avoids the problems of drafts and differing perceptions of which temperature is comfortable. Employees are thus able to control their own microclimate, leading to greater employee satisfaction and increased performance.

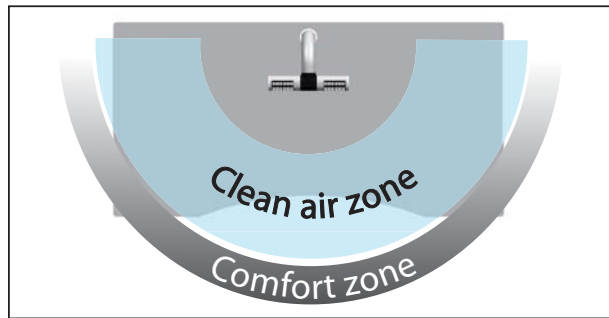
"We initially chose to install four PV units in our own office in the Maintenance department as a test, to gain experience with the system. After just a few weeks we were convinced that the PV system would be able to radically improve the indoor air quality for employees on the dealer floor, and therefore planned to install 59 PV units there.

"The units were installed in October 2008, and employees on the dealer floor have given the initiative an enthusiastic reception.

"PV units satisfy the employees' individual temperature and airflow preferences, as is evident from the very different settings they choose each day. Some employees choose the maximum airflow, and turn their neighbour's unit in their direction if he or she is absent. Others turn the diffuser head upwards so that the air descends from above.

"We have already received very positive feedback from PV users, even though the units have so far only been used during the winter half of the year. We are now entering the period with high outdoor temperatures, which has traditionally been a time of poor indoor air quality for my colleagues on the dealer floor. We are confident that the PV units will help ensure comfortable indoor air quality, even during the summer months, for the first time in many years.

"Jyske Bank uses the slogan – 'We make a difference', but this time it is Personalised Ventilation that has made a difference for us", concludes Kent Sørensen.



The diagram shows the region where employees' faces are situated, at the boundary between the Clean Air Zone and Comfort Zone. Employees like the aesthetics of the design and appreciate being able to adjust the ventilation (airflow) according to their needs, leading to improved performance and less absence due to sickness.

PV system at Jyske Bank

- Fifty-nine black anodised PV-Airzone 200 units installed at each dealer desk on the dealer floor
- Local quick-response dampers which can be individually set to the desired airflow.
- PV units with adjustable diffuser heads, allowing air direction to be adjusted horizontally and vertically to suit the user's needs
- The PV system is designed as a constant-pressure system. A pressure-activated damper in the main duct ensures that the desired airflow reaches each PV unit, regardless of the other user settings.
- The PV system at Jyske Bank was installed and is serviced by Klimodan, an engineering and ventilation contractor.

About Jyske Bank

- The Jyske Bank Group has around 120 branches in Denmark and employs more than 4,000 full-time staff, making it the third largest financial institution in Denmark. The Group also has subsidiary banks in Switzerland, Gibraltar, Great Britain, Germany, the Netherlands and France.
- The Bank offers a complete range of financial services for private individuals and small and medium-sized enterprises.
- The head office in Silkeborg houses Jyske Markets – an ultramodern dealer floor, open 24 hours a day, 365 days a year, which trades securities to a value of approx. DKK 180 billion each day.

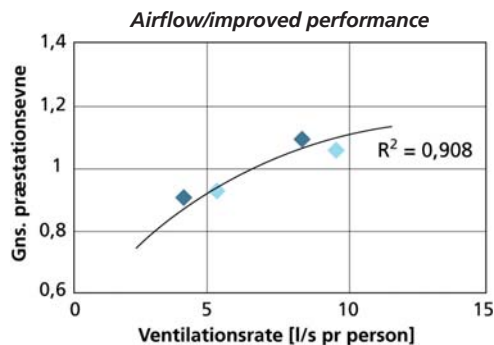
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 JYSKE BANK

Advantages of Personalised Ventilation

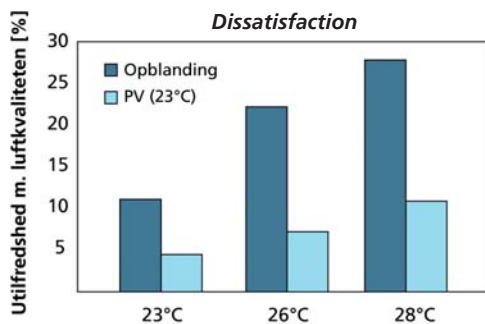
Professor Arsen Melikov of the Technical University of Denmark (DTU) International Centre for Indoor Environment and Energy (ICIEE) has done research in the area of Personalised Ventilation for the past ten years.

Professor Melikov's research has involved close to 500 students and more than 4,500 hours testing the characteristics of Personalised Ventilation. Some of the professor's results are illustrated below.



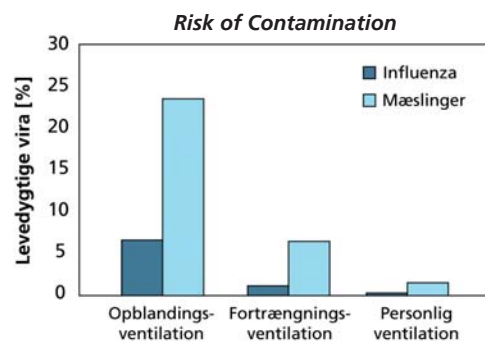
Airflow/improved performance curve. Many research projects have produced interesting results on the effects of improving the indoor environment.

Increasing airflow from 5 l/s to 10 l/s per person has been shown to lead to an average improvement in performance of more than 20%. Is providing a greater airflow per person an expensive option? No. Research has shown that the cost of running and maintaining technical systems in a building accounts for less than 1 per cent of the total expenditure per employee and per work station, including salary, amortisation of buildings, etc. In fact, ensuring the correct airflow to employees is an extremely profitable investment.



Personalised Ventilation also saves on energy for cooling, as room temperature does not have to be kept at such a low level. At a room temperature of 23 °C, only approx. 3.5 % of people who have PV are dissatisfied with the indoor air quality, whereas approximately 11% of people are dissatisfied where mixed ventilation is used.

Note that thousands of tests had shown it was not possible to create an indoor environment with which more than 95% of people were satisfied – until PV was invented. The light blue columns show that even at a room temperature of 28 °C, only about 10% of people who have PV are dissatisfied with the indoor environment, whereas approximately 28 % of people are dissatisfied where mixed ventilation is used.



Viral and bacterial contamination between office personnel depends on a wide variety of factors – including the type of ventilation system used. Tests indicate that Personalised Ventilation has significantly improved characteristics in this area also. The figure shows that using PV, the spread of living viruses and bacteria between two workstations is significantly reduced.

EXHAUSTO Personalised Ventilation – some facts

- Satisfied employees
- Superior job performance
- Reduced sick leave
- Aesthetic appearance
- Excellent return on investment
- Airflow of 8–10 l/s per person
- Constant-pressure system
- Compatible with VAV and DCV systems
- Recommended PV air temperature: 18 °C–23 °C



Source: International Centre for Indoor Environment and Energy
ICIEE - www.ie.dtu.dk