



Troldekt® Ventilation

Fresh air equates to an extra year at school

Pupils perform significantly better when the air quality is good. These are the findings of a study conducted by DTU—Technical University of Denmark at Vallensbæk School in south-west Copenhagen, where two rooms were fitted with a ventilation ceiling from Troldekt. The ceiling ensures optimum ventilation as well as fresh air injection, and markedly reduces energy consumption compared to conventional solutions.

There is a better learning in the air at Vallensbæk School – literally. A study conducted by Søren Terkildsen, PhD, from DTU Civil Engineering, shows that good air quality significantly increases pupils' ability to learn.

Two Year 6 classes – i.e. children aged 11-12 – participated in the study, which saw their classrooms being fitted out with Troldekt ventilation ceiling panels. The two classes were then tested in Danish and mathematics in two rounds. Once in a week where the low-pressure

90% less energy

The Troldekt ventilation ceiling uses 90 per cent less electricity than the previous ventilation systems in the two classrooms. In addition, there is a 50 per cent cost saving as regards heating the air.

ventilation system was running, and once in a week where the ventilation was not switched on. In addition, the pupils completed a questionnaire with 16 questions on the indoor climate and their physical well-being.

10% better results

Pupils working in the classrooms fitted with Trolldtekt ventilation at Vallensbæk School completed 5 per cent more assignments and made half as many errors. Overall, this means that they performed 10 per cent better.

More assignments with fewer errors

Generally, the tests showed higher levels of concentration among the pupils. In an improved indoor climate, the pupils completed 5 per cent more assignments and made half as many errors.

“When we compare the two results, our findings show that pupils perform 10 per cent better when the air quality is good. In other words, over 10 years spent at school, this corresponds to an extra year of learning,” says Søren Terkildsen.

He defended his PhD in September 2013, and is now employed as a plumbing, heating and ventilation engineer at the consulting engineers ØLLGAARD Rådgivende Ingeniører A/S in Hellerup, Denmark.

Before the new ventilation system was installed at Vallensbæk School, the CO₂ concentration could exceed 2,000 parts per million (ppm) in the hours that the school pupils were using the classrooms. The level of 2,000 ppm is twice as high as the recommended threshold value. After installing the Trolldtekt ventilation ceiling, the measured CO₂ concentration remained below 900 ppm.

Below 900 ppm CO₂

After the ventilation ceilings were installed, the CO₂ concentration in the two classrooms remained below 900 parts per million (ppm). Prior to installation, the CO₂ concentration could exceed 2,000 ppm.

Low pressure ensures perfect air mix

Søren Terkildsen highlights the considerable benefits resulting from the fact that Trolldtekt ventilation operates at low pressure.

“The air is supplied slowly and is evenly distributed. This ensures a perfect mixture of clean and used air which is impossible to achieve when the air is being injected at a higher pressure from a few air outlets. At the same time, there are no draughts or noise associated with this solution,” he says.



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*Søren Terkildsen, PhD,
from DTU Civil Engineering*

The trial in Vallensbæk documents a further significant advantage in having Trolldtekt ventilation: the solution can use up to 70 per cent less energy than new, conventional ventilation systems.

Contributing new knowledge

DTU Civil Engineering's test at Vallensbæk School was conducted under the auspices of 'Plan C' – a strategic partnership between the City of Copenhagen and the local authorities to the west of Copenhagen as well as a wide range of businesses within the energy, cleantech, construction and consulting sectors. The purpose is to generate knowledge and plans that increase and future-proof energy renovation in the local authorities and housing associations in the Greater Copenhagen area.

FACTS

Project: Renovation of Vallensbæk School

Ceiling: Trolldtekt acoustic panels in natural wood (fine structure) and Trolldtekt ventilation