Healthy Indoor Environment in Public Schools

EURO AIR It´s in the air

Poor indoor air quality in public schools

Often class rooms are not properly ventilated to meet the demands of the children and to ensure a good air quality for the children. Class rooms are characterized by many children/ students per square metre; this often leads to a high CO_2 level and a poor indoor air quality. Studies confirm that a poor indoor climate has a highly negative impact on the learning ability of the children. Headaches, lack of concentration ability, unnatural tiredness, dry eyes, bad odour and unmotivated children are among the things that are caused by poor indoor climate in public schools.

> The result of insufficient fresh air is unmotivated children, headaches and lack of learning ability.

The Danish Working Environment Service has made several tests where the result of insufficient or nonventilation systems in public schools is confirmed. Often it is a matter of economics that stops the improvement of public schools. According to the the Technical University of Denmark (DTU), it will only cost 2.5 % (approximately 70,000 €) of the total price for a child's schooling during 9 years of schooling to improve the indoor climate for the children.

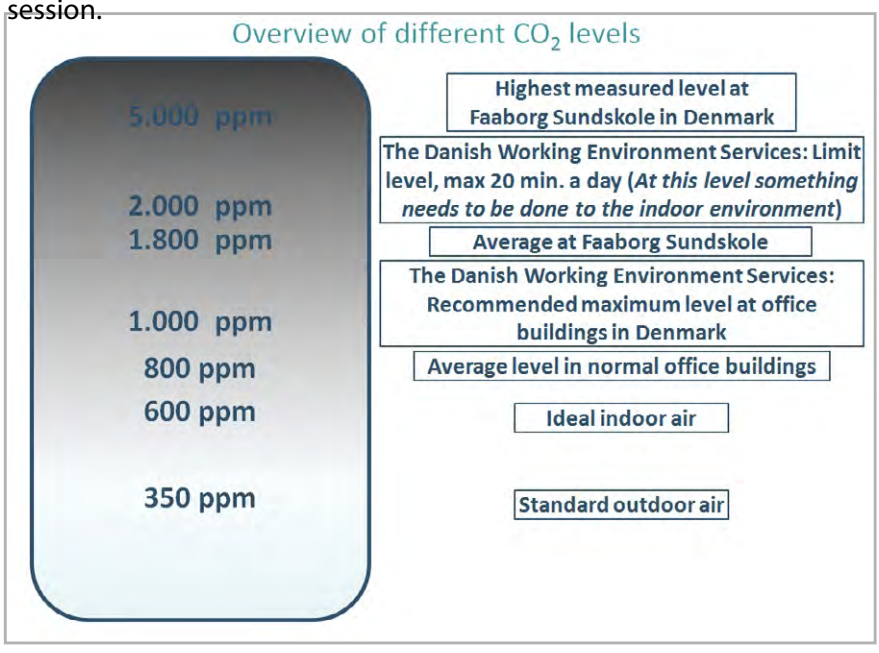
What are the results of poor indoor climate in public schools?

Recent studies have shown that the CO_2 level in many public schools in Denmark exceeds The Danish Working Environment Services' advisable level of 1,000 ppm.

Since April 2007 The Danish Working Environment Services have carried out tests in more than 1,300 schools, and one out of five schools has problems with the indoor climate - they do not have sufficient ventilation.

At Faaborg Sundskole the ppm level was measured at more than 1,900 ppm before the beginning of a two hour session.

> Tests at Faaborg Sundskole, DK, established a ppm level higher than 1,900 ppm immediately before the beginning of a two hour session. The recommended maximum level is 1,000 ppm.



With a proper ventilation system they could have prevented this situation.

However, at Faaborg Sundskolen the only possibility for ventilation is to open a window. 10 min. into the lecture the level had risen to over 2,000 ppm. According to the The Danish Working Environment Service, something has to be done when the ppm level in a room exceeds 2,000.

They advise that people only be exposed to this high concentration in short periods during the day. At the end of the session the CO_2 level was over 3,500 ppm. Both teachers and children suffer frequent headaches. All the children have complaints about the indoor environment at Faaborg Sundskole.

Lower room temperature improves learning ability

An experiment at Rungsted Skole in Denmark was carried out with children in 4th to 6th grade (10 - 13 years old) performing a written test in a room in which the room temperature was lowered from 25°C to 20°C. They experienced an improvement of 10-20%. At the same time a test involving an increase of the fresh air rate from 10 m^3/h to 36 m^3/h showed a similar improvement of 10-20 %.

By improving the indoor climate in public schools, the learning capability of the children would increase by up to 18%*).

*)Source: DTU

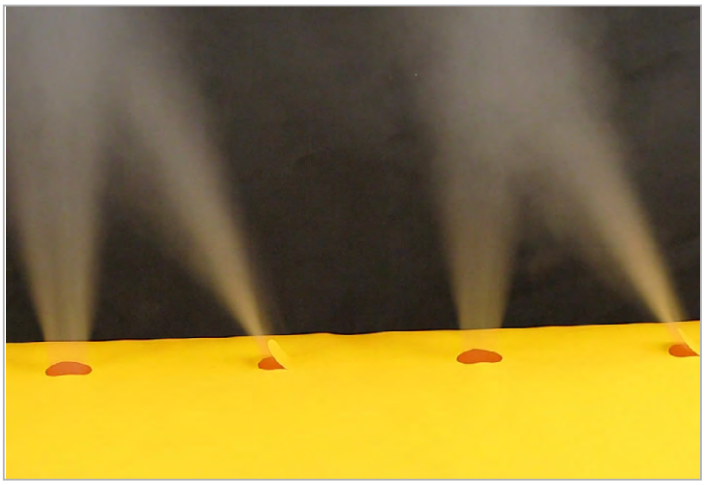
Prevent stagnant air and draft problems with proper ventilation

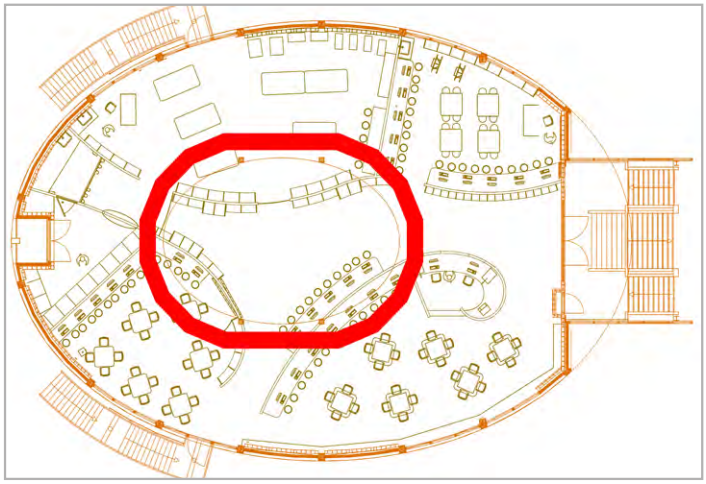
To ensure a good fresh air rate per student, a large amount of fresh air (20 $m^3/m^2/h$) is often required. This may cause problems with draft from traditional diffusers. An fabric duct system is a very efficient solution because the entire surface of the duct is used to ventilate the room. This also applies when using the fabric ducts for cooling because the entire surface of the fabric is used compared to traditional ventilation where the air only enters the room at a few points.

Another advantage of the fabric duct system is the good sound properties compared with a traditional air diffuser. A Euro Air diffuser can be used in a NR 25 room and is therefore a school application.

Further, a fabric duct system from Euro Air can be used with a VAV/DCV system that is controlled by the CO_2 content in the room.

Case study: Regionale Schoolegemeensch, NL





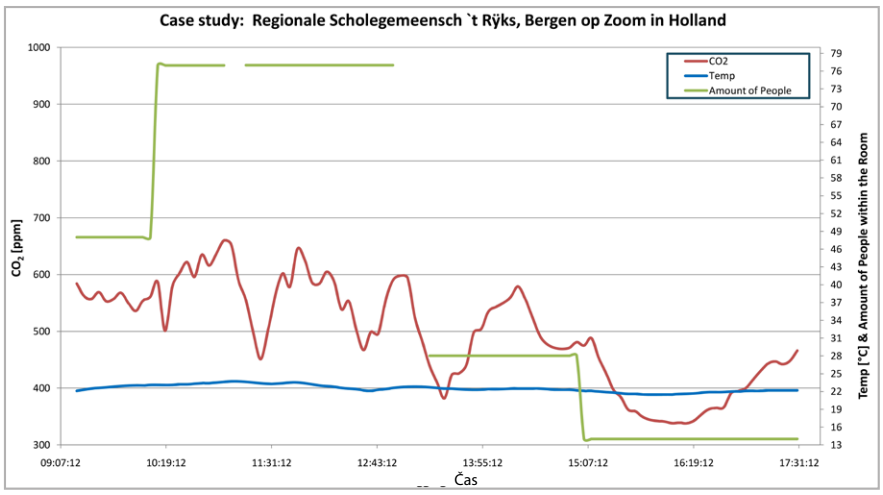
Through BLT Luchttechniek in Breda, NL, Euro Air has supplied a new DFC Induction System to a science class room. DFC Induction is a new hybrid System supplying air through the fabric and through a patented baffle system.
BLT chose the DFC Induction to diffuse the air more evenly into the room. The way of ventilating the room is known as a hybrid system, were both the DFC Induction and textile part of the duct will be active. Another advantage of the new Euro Air DFC Induction System is that entrainment is not a problem, compared to other products such as lager holes. The direction baffle ensures that the air will be directed perpendicular into the room.
The room is a new building where the children work in groups at different science projects.

The highest measured CO_2 level in a class of 77 people was 660 ppm. The average during an entire day of schooling was only 492 ppm which is more than approved.

Based on the CO_2 measurements made in the room and the feedback from the children as well as the teachers they are all very pleased with the design and indoor environment of the class room.

Euro Air has successfully made many installations in schools all over the world. This can be done in new buildings and also in retrofitting projects.

For more information go to www.euroair.eu.



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