KE FIBERTEC

Textile ducts meet high demands on indoor climate in multipurpose arena

Exciting project of ventilation, cooling and heating

Ventilation of sports centres with large public crowds is often very complex if the solution has to work both during daily events when the heat load is limited, and in situations with several thousand spectators.

In co-operation with Bravida Esbjerg, KE Fibertec has been involved in an exciting project with ventilation, cooling and heating of Skjern Bank Arena, a part of Skjern's new cultural centre.

FACTS:

Customer:	Skjern Bank Arena
Contractor:	Bravida Esbjerg
Materials:	KE Fibertec

Textile based ventilation in multipurpose arena

With its 2,450 m² of floor space, the multipurpose arena in Skjern Cultural Centre, "Skjern Bank Arena" can be converted for many different uses, for example concerts and theatrical performances, exhibitions and large sports events.

Be it a handball match or an exhibition, there are high demands on the indoor climate in such multipurpose arenas and acoustics, air temperatures and air velocities require extra attention as early as in the design phase of the project.

Directional air supply through nozzles

Skjern Bank Arena has the dimensions 48 x 51 metres and a ceiling height of 11 metres. The arena is fitted with two training playgrounds across the sports centre area which is primarily used for handball training without spectators.

When the arena is used by Skjern's male team in the Danish handball league for instance, a game area lengthwise of the sports centre is used. During such elitist sports events, flexible telescope stands are pulled out from the sides of the playground so that the spectator capacity is increased to 2,400 persons.

TECHNICAL DATA:

System:	KE-DireJet® System (nozzles)
Air quantity:	13,640 - 40,000 m³/h
Control:	CO_2 (max. 1,500 ppm)

Apart from the heat supplement from the lighting and persons, no heating is installed. Therefore, the requirement of the system was to provide ventilation, heating and cooling.

To meet these requirements, KE Fibertec chose a solution with KE-DireJet® Systems in a non-permeable material which combines directional injection of air through nozzles with a long penetration (the ability to inject hot air over long distances).

VAV-system

The ventilation is designed as a VAV-system (Variable Air Volume) where the air quantity is adjusted to the actual heat load in the sports centre. In the case of Skjern Bank Arena, it was decided to design the system with air quality control, i.e. the supplied air quantity is controlled by the number of spectators in the arena. A CO_2-device with a predetermined maximum value affects a frequency converter which controls the number of revolutions for the fan and thereby the air quantity.

KE-DireJet® ducts ventilate arena

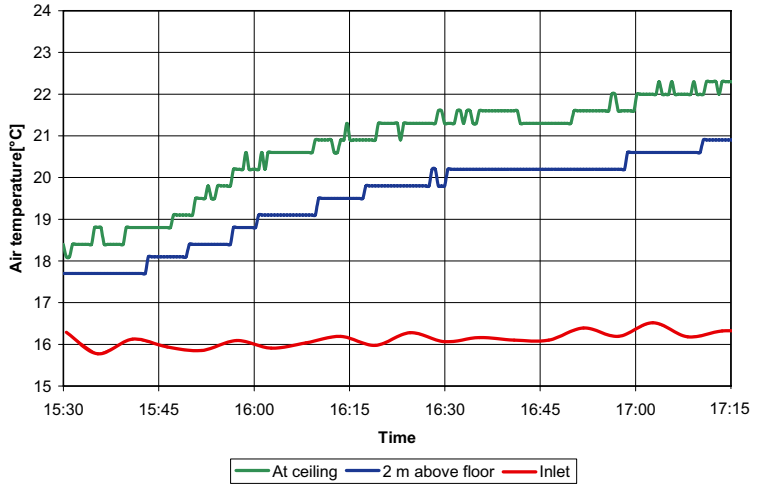
The system is made as a so-called 2:1 system with 6 KE-DireJet® ducts placed lengthwise in the arena. 4 of the ducts are placed directly above the game area and 2 ducts are placed above the telescope stands. These 2 ducts are always in operation and provide a minimum air quantity of 13,400 m^3/h to ensure the desired air temperature at minor events and training. At large sports events these ducts are used for ventilation and cooling of the spectators.

As the CO_2-level in the arena increases, dampers turn on the remaining ducts through throttling governors. The building owner has set the maximum limit for the CO_2-level to 1,500 ppm. If the CO_2 exceeds this value the air quantity is increased and at events of long duration the maximum air quantity of 40,000 m^3/h is reached.

Measurements carried out during top match

In co-operation with Bravida Esbjerg, KE Fibertec carried out measurements in two different operational situations. The first measurements were carried out in an empty arena, and the other measurements were carried out during a top match in the Danish league between Skjern and Copenhagen.

The measurements in an empty arena showed that the air velocities in the occupied zone were below 0.15 m/s, and the vertical temperature gradient (temperature difference between the occupied zone and the ceiling) was less than 1°C.



Temperature measurements carried out during the game between Skjern and Copenhagen. The match was played between 16:00 and 17:15 o'clock.

Even temperature level

At the match between Skjern and Copenhagen there were 2,160 spectators, and the enthusiasm among the crowd was at the boiling point. To examine the temperature level in the arena throughout the match, temperature measurements were carried out in the occupied zone and at the ceiling behind the spectators. Also the inlet temperature was registered.

As shown there is no considerable temperature gradient in the arena (max. 1.4°C), and the temperature level is very acceptable. At the beginning of the game the room temperature was 19°C in the the game zone increasing to approx. 21°C by the end of the game. The inlet temperature varies throughout the game around a mean temperature of 16°C.

The first operational experience with the system has been very positive:

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The solution with textile ducts works very well and has proven to be an effective solution. We have experienced a good indoor air quality in the arena, and there are no draughts and no problems with the air temperature.

K.E. Kristensen, Manager, Skjern Cultural Centre

KE Fibertec AS is market leader in Textile Based Ventilation. We create good indoor climate through our tailored textile ducts for installation in sports arenas, offices, laboratories, schools etc.

Textile ducts are customizable, easy to install, washable, hygienic, and come in all shapes and colours.

For more information please visit our website: www.ke-fibertec.com.

For more information, please contact:

KE Fibertec AS
Tel. +45 75 36 42 00
info@ke-fibertec.dk
www.ke-fibertec.com