



## Natural Ventilation behind the scenes

YMCA East Anton is a purpose-built nursery for 0-5 year olds which opened in October 2017. At early design stage it was suggested that the classrooms should have mechanical ventilation systems. However, YMCA had concerns about the energy use as well as maintenance costs associated with a mechanical ventilation scheme. Breathing Buildings were approached by Darcy Construction to design a natural ventilation system that would be unobtrusive and provide high levels of ventilation to keep the rooms fresh.



<b>PROJECT</b>	YMCA East Anton Nursery and Community Centre
<b>LOCATION</b>	Andover, Hampshire
<b>SECTOR</b>	Education
<b>PRODUCTS</b>	F Series units and dampers
<b>HISTORY</b>	Project started in March 2017 and opened in October 2017



Each classroom has its own toilet with a void above; this void was initially intended to host a mechanical ventilation system and associated ductwork. The alternative, lower energy solution developed by Breathing Buildings involved fitting an F1000 unit into each of these voids to provide tempered fresh air. The balancing flow path is via a louvre and damper at high level. In cold weather the F1000 system recycles the heat admitted through solar gain on the south-facing façade and the heat emitted by the children and carers in order to pre-heat the incoming ventilation air. This allows a smaller heating system to be specified than would be possible

with a traditional natural ventilation design. In summer, when the children are roaming in and out of the classroom and outside play area, the fresh air enters the rooms at low level via the doors or windows. It then flows across the space, providing much valued cross-flow ventilation, and exits out through the F1000 unit and high level damper.



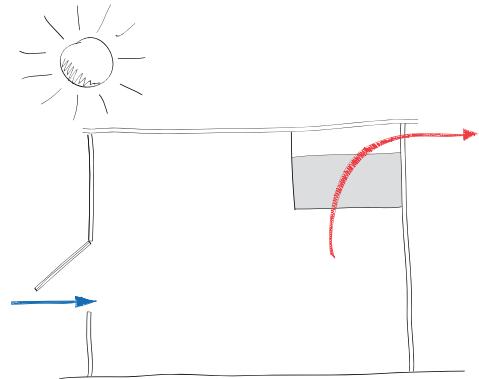
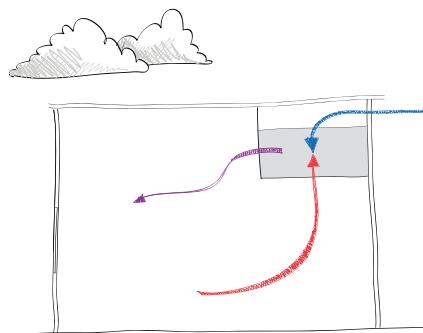
At the end of the hottest days in the summer, the system automatically moves into a night-



cooling mode. This mode ensures that the space continues to ventilate and benefit from the colder night time temperatures. The fabric of the building is passively cooled alleviating the need to air condition the south facing nursery.

The reception area has wrap-around glazing and catches the sun first thing in the morning. Without windows or doors open, it would have been uncomfortably hot even at 7:30am when the nursery opens. However, a Breathing Buildings NVHR system serving this area provides night cooling via a secure opening at high level, and also provides a fan boost mode to drive more cool air into the space than natural ventilation alone would provide.

This slimline unit is neatly tucked up against the ceiling and provides a throw of up to 10m into the space.



### **Summer Strategy**

In warmer weather when it is acceptable to bring fresh air straight onto occupants the control system encourages room users to open windows at low level. The high level dampers are opened automatically and the system operates in upflow displacement, cross-flow ventilation mode. The damper openings are regulated by the control system in order to keep the interior at ideal comfort conditions.

During the hottest summer periods the room ventilation continues at night in order that the room can benefit from the naturally occurring colder temperatures. The room fabric is cooled down at night, again controlled by the controller to ensure that the room is not over-cooled, in order to provide optimum conditions the following day.

### **Winter Strategy**

In winter when it is too cold to bring in fresh air straight onto occupants the F Series system operates by drawing air in through a damper and into a mixing unit. The mixing unit uses two counter-rotating sweep fans; the lower fan draws in hot room air and the upper fan prevents this air from leaving the room. The cold fresh air entering the top of the mixing unit is thereby mixed with the room air, and the mixed air is discharged into the room.

Air is exhausted from the room by a damper on the same side of the building as the F Series unit in order to help avoid inflow through this damper. The control system and critically the draught mitigation strategy, use readings from a room temperature and CO<sub>2</sub> sensor, as well as temperature sensors outside the building and within the F Series mixing unit.

[www.ymca-fg.org/ymca-east-anton/](http://www.ymca-fg.org/ymca-east-anton/)



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