Hybrid Thermal Mixing Ventilation

High performance, low carbon ventilation

- Exceptionally low power consumption
- Provides the ideal environment for school classrooms/areas
- Designed to provide mixed tempered air during winter, boosted levels of ventilation during summer and secure night time cooling
Hybrid Thermal Mixing (HTM) systems are designed to provide natural ventilation and hybrid ventilation incorporating mixed tempered air for winter periods. In addition, the systems have the ability to provide secure night time cooling, and boosted levels of ventilation during summer. The HTM systems are designed to work in conjunction with natural ventilation and can be used in single sided or cross flow ventilation strategies.

The HTM system solution is comprised of an intelligent and fully automatic control system coupled with a low energy ventilation system which switches between operational modes dependant on season, external/internal temperature conditions and indoor air quality (IAQ).

Why Choose Hybrid Thermal Mixing?

Ideal Environment

- Monodraught’s HTM solution is able to provide the ideal environment to school classrooms/areas.
- The HTM system is designed to provide mixed tempered air during winter, boosted levels of ventilation during summer and secure night time cooling.
- HTM works in conjunction with natural ventilation provided by manual or automatic windows/louvres.
- The system can be used in single sided or cross flow ventilation strategies.

Exceptionally Low Power Consumption

- The HTM system has an exceptionally low specific fan power.
- It comprises an intelligent and fully automatic control system coupled with a low energy ventilation system which switches between operational modes dependant on season, external/internal temperature conditions and indoor air quality (IAQ).
- The HTM control system is supplied as standard with full data logging facility, temperature and CO₂ controls. With an optional BACnet module, each unit has the ability to output key performance data to central BMS.

Typical Installation - Operation Detail

Monodraught HTM system mounted on the façade (can be ducted to provide ventilation to the rear of deep plan rooms) to assist with single sided ventilation using openable windows. The system automatically provides secure night time cooling through natural ventilation opening or fan assisted if required. Winter ventilation automatically modulates dampers to mix re-circulated air with external air to ensure optimum ventilation temperatures.
Two versions of Monodraught’s HTM system are available, the HTM F and the HTM FS, each one with a LTHW variant. The “F” type has been designed to have one unit per classroom, and the “FS” type two units per classroom. The HTM F system is able to produce 350 l/s of daytime ventilation and 530 l/s for night purge ventilation when required, while the HTM FS system is able to produce a daytime hybrid ventilation rate of 180 l/s (SFP 0.14) per unit and night time ventilation rate of 250 l/s (SFP 0.22) per unit.

*FS Provided with or without ducting

Grenfell Tower Community Centre - HTM FS
**Modes of Operation**

HTM can run in various operational modes dependant on the conditions of the environment in which it is installed, this is usually determined by the two sensors which monitor the room’s temperature and CO₂ levels from the wall mounted controller.

- **Natural Ventilation Mode**
  The system’s primary function is to provide Natural Ventilation in conjunction with openable windows. If CO₂ rises above 900 ppm or the temperature rises above 18°C*, the system will operate in natural ventilation mode by opening both the external and recirculation damper in staggered increments.

- **Mixed Mode**
  During winter periods, if the CO₂ rises above 900 ppm but the external temperature drops below 15°C, the system will operate under a mixed mode strategy. This is achieved utilising the fan to mix and recirculate mixed fresh external air with warm room air to create a fresh and tempered indoor environment.

- **Boost Mode**
  During daytime periods in the spring, summer and autumn seasons, if the internal room temperature exceeds 22°C* or the CO₂ level goes above 1100 ppm, the system will provide a boosted level of ventilation until which time optimum conditions are met.

- **Night Time Cooling Mode**
  During summer periods between 23:30 and 06:30 and when the internal temperature is above 18°C, the system will provide night time cooling providing a peak ventilation rate of 530 l/s until such time that internal temperature goes below 18°C.
Control Strategy

The HTM unit incorporates a fully automatic control system based on a seasonal control strategy. The seasonal strategy is determined by time and date but is weather compensated to pick up unseasonal conditions. The system provides natural ventilation as the default method of ventilation indicating when manual windows or automatically opening dampers should be utilised to maximise IAQ and maintain comfort levels.

The control system incorporates a number of temperature sensors integral to the unit to monitor external temperature, mixed air temperature and supply air temperature. In addition, a wall mounted controller fitted with an internal temperature, CO₂ sensor and user override are included as standard.

Data is stored per minute on an integral data card for data analysis and compliance requirements.

Controls and User Interface

Monodraught offer three wall controller options, each dependant on the room design and layout and the user’s requirements. One wall controller is required to be mounted within each room and will give the user certain functionality over the systems.

**Openable Window:** Allows the user to control the fan speed but will also indicate when they need to open windows to aid the system in providing ventilation.

**Louvre Override:** Allows the user to not only control the fan speed of the units but also regulate the amount that the VENTSAIR Façade system opens by if fitted.

**Smart Screen Controller:** Through the capacitive touchscreen interface a user can explore how the systems work, adjust settings and find out information on the system in order to maintain a comfortable environment with minimal energy use.

Openable Window Option

1. **Boost mode:** Will provide a boosted level of ventilation
2. **Auto mode:** Allows the HTM system to operate within its 3 automatic modes
3. **Off mode:** Closes the high level exhaust damper and stops the fan from operating
4. **LED** illuminates to notify users when it is necessary to open windows

Louvre Override Option

5. **Louvre LED’s**
   - No LED = Closed
   - 1 LED = 10% open
   - 2 LED = 25% open
   - 3 LED = 60% open
   - 4 LED = 100% open
6. **Louvre Plus** - Opens the Ventsair louvre by 1 setting
7. **Louvre Minus** - Closes the Ventsair louvre by 1 setting
8. **Temperature and air quality sensor**

Smart Screen Option

Self-Test Mode

The Louvre Override and Smart Screen wall controllers also have the ability to perform a self-test operation. The wall controllers are able to run a diagnostics test on the HTM unit to search for any faults with the system. If any faults are found, they will be indicated to the user. This test can be initiated by either a Monodraught engineer or a facility manager.