

Department for Education **Compliance Made Clear**

How the **Mistrale Fusion Deo MFS-HR**
supports the DfE Technical Manual

February 2026

A clear reference document for designers and specifiers working on DfE projects. It shows how the MFS-HR helps meet key requirements for indoor air quality, thermal comfort, acoustics, energy performance and net zero targets.



INTRODUCTION

Purpose and Scope

Delivering schools and colleges that are comfortable, energy-efficient and fully compliant with the latest Department for Education [DfE] standards is increasingly complex. The DfE Technical Manual - Employer's Requirements [March 2025], issued as part of the Construction Framework 2025 [CF25], sets detailed expectations for indoor environmental quality, operational energy, carbon performance and whole-life sustainability. Designers, contractors and consultants must demonstrate that their ventilation strategy supports these outcomes while remaining practical to install, operate and maintain.

This document has been created to help project teams understand where the **Mistrale Fusion Deo MFS-HR hybrid ventilation system aligns with the DfE's technical requirements**. From indoor air quality and overheating mitigation to acoustic performance, airtightness and energy modelling - to the tested capabilities and verified data of the MFS-HR.

By presenting the DfE requirements in clear language and showing how the MFS-HR addresses them, this guide enables architects, engineers, contractors and specification managers to make informed design choices, produce robust compliance documentation and reduce risk during design, approval and construction under CF25.



ENVIRONMENTAL PRINCIPLES

Healthy and Productive Spaces [Indoor Environmental Quality]

The Department for Education requires that learning environments provide good indoor air quality and maintain comfortable thermal, acoustic and visual conditions to support the health, wellbeing and productivity of pupils and staff. Ventilation strategies must work in harmony with daylight, heating and cooling systems, and acoustic design to create an integrated approach to indoor environmental quality.

The Mistrale Fusion Deo MFS-HR has been designed specifically to support these outcomes. Its hybrid natural ventilation strategy maintains fresh air supply and actively monitors carbon dioxide levels, automatically increasing fan support when indoor concentrations approach the DfE limit of a daily average below 1000 ppm, with a maximum of 1500 ppm for no more than twenty consecutive minutes. The unit's insulated, thermally broken construction and high-efficiency plate heat exchanger help stabilise supply air temperatures and avoid cold draughts.

Operational noise has been measured against BB93 criteria, and an optional low-noise configuration is available for spaces such as special educational needs [SEN] classrooms. By avoiding air re-circulation and integrating naturally with passive strategies, the MFS-HR complements the broader environmental design approach required by the DfE.

Reducing Emissions [Operational and Whole-Life Carbon]

The DfE expects new school and college buildings to reduce both operational energy demand and whole-life carbon, supporting the UK's trajectory towards net zero. Designers must select systems that minimise energy use before renewable generation is considered, and they should evaluate the embodied carbon and replacement cycles of major components over a standard sixty-year reference period.

The MFS-HR contributes directly to these goals by reducing ventilation energy demand at source. Its plate heat exchanger achieves among the highest heat-recovery effectiveness available for classroom hybrid units, helping reduce heating demand and support Part L and TM54 energy models*. The system's low specific fan power and airtight construction further reduce electrical demand. As a robust, UK-manufactured product with easy access for servicing and long-life components, the MFS-HR also supports whole-life carbon reduction by limiting the need for premature replacement.

Climate-Resilient Design

School and college buildings must remain comfortable and functional under future climate conditions, including hotter summers and more extreme weather events. Designers are encouraged to prioritise passive solutions such as night cooling and purge ventilation whilst providing adaptability to changing temperatures.

The MFS-HR enhances resilience through its ability to operate in several modes. During warm weather it can run in a dedicated "Cool Recovery" mode, using cooler indoor exhaust air to pre-cool incoming supply air across the plate heat exchanger, helping to limit overheating in line with BB101 Overheating Risk Assessment criteria. In addition to Cool Recovery, the unit can provide night-time purge and controlled hybrid boost when natural driving forces alone are insufficient. These capabilities allow design teams to demonstrate performance using the latest CIBSE weather files and future climate scenarios.

Promoting Nature Connectedness

The DfE encourages designs that integrate nature-based solutions, including the use of passive ventilation and biodiversity measures, to improve both environmental performance and the educational experience.

*Independent test data available on request.

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The MFS-HR supports this principle by prioritising passive stack and cross-ventilation through façade-integrated terminals before activating its low-energy fans. This natural-first strategy aligns with the DfE's emphasis on reducing mechanical dependence and creates a closer connection between the building and its outdoor environment.

Efficient Resource Management

Durability, ease of operation and efficient maintenance are critical to long-term sustainability and resource management. The DfE expects systems to function reliably over decades with minimal intervention and straightforward servicing.

The MFS-HR has been engineered for longevity. Filters, fans, the heat exchanger and the condensate management system are all directly accessible for inspection and replacement. Controls are simple to operate, with options for wireless local interfaces and full integration with a building management system where required. This straightforward approach helps schools manage ongoing maintenance and reduces the embodied carbon associated with frequent equipment replacement.

Thermal Comfort and Overheating

Buildings must be designed to reduce the risk of overheating in accordance with the DfE's Overheating Risk Assessment methodology and to avoid discomfort from cold draughts.

The MFS-HR addresses both conditions. In hot weather the Cool Recovery mode lowers the temperature of supply air when outside air is warmer than the room set-point, limiting the amount of heat introduced through ventilation. During colder months, the unit's insulated and airtight design, combined with

plate heat recovery, helps maintain comfortable supply air temperatures and avoids draughts at occupant level. Its ability to shift between natural, hybrid and purge modes allows the system to support year-round comfort.

Acoustic Comfort

Good acoustics are essential for inclusive and effective learning. The DfE requires spaces to meet BB93 limits for indoor ambient noise, reverberation time and airborne or impact sound insulation, with particular care for pupils with hearing or speech needs.

The MFS-HR has undergone independent testing to verify low operational noise levels in accordance with BB93 descriptors. Where necessary, it can be specified with additional attenuation or reduced-speed operating modes for sensitive environments. Its fully segregated airstream design eliminates mechanical recirculation, reducing cross-talk between spaces and supporting the DfE's requirement for acoustic inclusivity.

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Operational Energy and Carbon [EUI and TM54]

The DfE sets maximum energy use intensity [EUI] values: 52 kWh/m² for primary schools, 60 for secondary schools, 70 for colleges, and 52 for special schools or colleges. At least sixty percent of a building's annual energy demand should be met by on-site renewable generation, with a typical minimum yield of 45 kWh/m² of building footprint. Energy use must be modelled dynamically using CIBSE TM54 and the latest 2020 Test Reference Year weather files, including out-of-hours and standby loads.

The MFS-HR supports these targets by significantly reducing ventilation energy demand. Its high heat recovery efficiency, low specific fan power and airtight construction contribute to lower overall EUI figures, making it easier for design teams to comply with the DfE limits. This results in significant savings on larger element heating with up to 3.5kW of energy saved per classroom.

The table below shows the results for a typical classroom with one MFS-HR2-C or two MFS-HR1-C.

OAT [degrees C]	Heat Loading Occupants	Heat Load [other]	Heat Losses [building]	Net Heat Loading	Energy Lost Through Fresh Air [MFS-HR]	Energy Recovered	%	Heating Power	Spare Capacity of MFS-HR	Maximum Energy Recoverable
-5	2240	800	1300	1740	5376	3494	65	142	-142	3536
-3	2240	800	1200	1840	4992	3152	63	0	93	3284
-1	2240	800	1100	1940	4608	2668	58	0	327	3031
1	2240	800	1000	2040	4224	2184	52	0	562	2779
3	2240	800	900	2140	3840	1700	44	0	796	2526
5	2240	800	800	2240	3456	1216	35	0	1030	2273
7	2240	800	700	2340	3072	732	24	0	1265	2021
9	2240	800	600	2440	2688	248	9	0	1499	1768

Conditions: 21C room, 160l/s fresh air, typically above 10C OAT no heat required.

VENTILATION PRINCIPLES

Principles of Ventilation Design

Ventilation must be predominantly passive wherever possible, with cross-ventilation to teaching spaces, seminar rooms, staff rooms and social areas. Designers should minimise the ingress of external pollutants, provide appropriate filtration, ensure effective air distribution and coordinate windows and blinds. Night purge openings must be secure and restrict unauthorised access.

The MFS-HR enables these principles by operating naturally as the default, with clearly defined intake and exhaust paths and the ability to support stack-driven and cross-ventilation strategies. Where local air quality requires, the system can be fitted with suitable filtration to protect occupants. Its top-exhaust approach aids removal of stale or polluted air, whilst tested diffuser and grille selections ensure even air distribution.

Ventilation Calculations and Opening Areas

The DfE requires that summer, winter and mid-season ventilation calculations are undertaken. Effective opening areas must be defined using BB101 Annex D and, where possible, tested in accordance with BS EN 13141.

Gilberts provides verified effective area data and discharge coefficients for MFS-HR terminals and ventilators. This supports early-stage design calculations and compliance reporting. The system's natural ventilation paths, night purge potential and any insect mesh impacts can be accurately represented in BB101 and AM10 modelling.

Room-Based Ventilation Units and Heat Recovery

Mechanical supply and extract units must include heat recovery unless unsuitable, and recirculation is not permitted when serving multiple spaces. Systems should be designed to avoid cross-contamination.

The MFS-HR uses a high-efficiency plate heat exchanger with fully segregated airstreams, ensuring no re-circulation or contamination. It includes an integrated condensate management system, with tray and pump to deal with winter operation and optional chilled coils, fully aligned with the DfE's ventilation unit requirements.

Science Spaces, Chemical Stores and Prep Rooms

Science laboratories and studios must provide a minimum exhaust ventilation rate of 4 l/s per square metre, while preparation rooms require an increased rate of 7.5 l/s per square metre to ensure safe dilution and extraction of airborne contaminants. Chemical stores must be ventilated continuously, providing no less than two air changes per hour over a 24-hour period to prevent the build-up of hazardous substances. Where science rooms are used as general teaching spaces, they are expected to meet the same indoor air quality performance requirements set out for standard classrooms.

The MFS-HR system can be configured to meet the required extract rates for specialist spaces such as laboratories, studios and preparation areas. Units may be specified in extract-only mode where increased air change rates are necessary, ensuring compliance with higher ventilation demands whilst maintaining full segregation of airstreams and safe removal of contaminants.

Louvres, Grilles and Dampers

External terminals must meet BS EN 13030 weather and airflow ratings, allow maintenance access and drainage, and be tested for air leakage and thermal performance [e.g., BS EN 1026]. Dampers must comply with BS EN 1751.

The MFS-HR's dedicated external louvre terminal integrates seamlessly into façades whilst maintaining segregated intake and exhaust airstreams and controlled drainage. Its dampers use high-performance seals to achieve low leakage, and the terminal construction incorporates thermal breaks and insulation to reduce heat loss. Test data supporting EN 13030, EN 1026 and EN 1751 compliance can be provided.

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CO₂ Control for Teaching Spaces

General teaching spaces must achieve a daily average CO₂ concentration below 1000 ppm, with a maximum of 1500 ppm for no more than twenty consecutive minutes.

The MFS-HR is equipped with demand-controlled ventilation based on real-time CO₂ sensing. The system increases fan support when required to maintain concentrations within the DfE limits, whilst favouring natural ventilation whenever outdoor conditions allow. Verified performance data can be supplied to demonstrate compliance during commissioning and operation.

BMS, Controls and Performance Monitoring

Building management systems must automatically control and monitor ventilation, heating and cooling, as well as air quality and energy consumption. Controls should be reliable, adaptable and straightforward for school staff to operate after handover.

The MFS-HR can function as a stand-alone unit with a simple local user interface or integrate into a wider BMS using standard open protocols such as BACnet or Modbus. It provides real-time data on temperature, IAQ and system status, supports alarm reporting and offers manual override options where required. Gilberts supplies clear control narratives and training to simplify long-term operation and maintenance.

Healthy and productive spaces

Learning spaces must provide good air quality and maintain thermal, acoustic and visual comfort to support health, wellbeing and productivity.

- Provides hybrid natural ventilation with CO₂ monitoring and demand-led fan boost to keep daily average CO₂ below 1000 ppm [max 1500 ppm for ≤20 min].
- Operates natural-first to avoid draughts; insulated, thermally broken construction limits cold bridging.
- Low operational noise tested to BB93; optional attenuation for SEN spaces.

Reducing emissions

Buildings must minimise operational and whole-life carbon, including energy used for ventilation, and support the UK's net zero trajectory.

- Industry-leading heat-recovery performance reduces heating demand and supports Part L and TM54 modelling.
- Low specific fan power [SFP] and airtight terminal reduce energy losses.
- Supports net zero ready design by cutting ventilation energy ~20%, enabling ~7% smaller PV/heat-pump sizing.

Climate-resilient design

Schools/colleges should remain comfortable and usable under future climate scenarios, including hotter summers and more extreme weather.

- Cool Recovery mode uses exhaust air to pre-cool incoming warm air, reducing summer overheating risk in line with BB101 Overheating Risk Assessment.
- Multiple operating modes [natural purge/night cooling/hybrid boost] help maintain comfort in varying conditions.

Promoting nature connectedness

Designs should use passive, nature-based solutions [e.g., natural ventilation, biodiversity enhancements] that benefit occupants and ecology.

- Prioritises passive stack and cross ventilation via façade louvres before activating fans, supporting a natural ventilation strategy aligned with DfE guidance.

Efficient resource management

Durable, maintainable systems that support long service life and reduce embodied carbon from frequent replacement.

- Accessible filters, fans, heat exchanger and condensate management simplify servicing.
- Robust UK-manufactured unit supports long lifespan and lower replacement carbon over the DfE's 60-year reference period.

Thermal comfort

Buildings must reduce overheating, comply with the Overheating Risk Assessment [ORA], and avoid cold draughts to maintain a stable indoor environment.

- Insulated, airtight construction and heat recovery reduce cold draughts.
- Cool Recovery mode lowers supply air temperature when outside air is warmer than desired, supporting BB101 ORA compliance.

Acoustic comfort

Spaces must meet BB93 indoor ambient noise levels, airborne/impact insulation and reverberation targets, supporting inclusive environments for pupils with hearing or speech needs.

- Independently tested data shows low operational NR/LAeq.
- Optional reduced-noise configurations for SEN/ASN settings; fully segregated airstreams avoid cross-talk and mechanical recirculation noise.

Operational energy & carbon [EUI]

The DfE limits school EUI [52–70 kWh/m²], requires ≥60 % onsite renewables [≥45 kWh/m² yield], and TM54 modelling with 2020 weather, including standby loads.

- Low SFP fans, airtight design and high % heat recovery reduce ventilation energy demand, supporting EUI targets.
- RAAM/TM54 data supplied for accurate whole-building modelling and renewable sizing.
- Natural-first strategy further lowers operational energy, easing compliance with UKNZCBS and DfE net zero objectives.

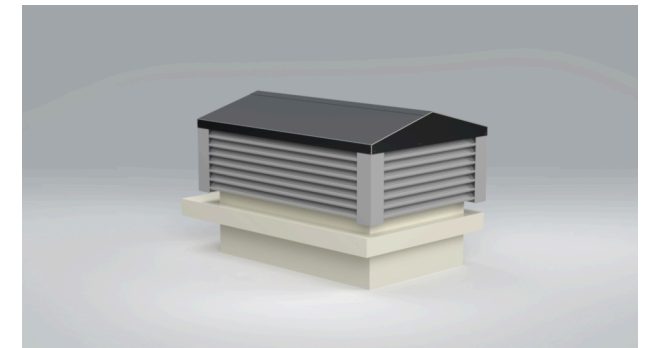
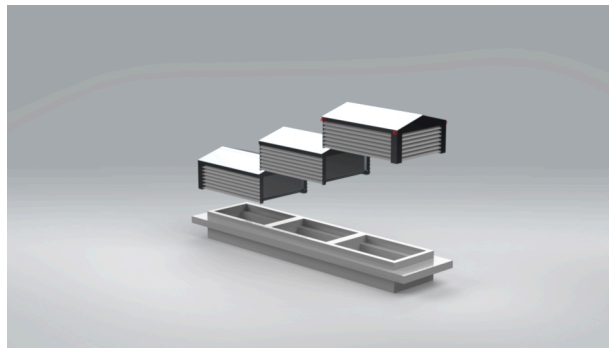
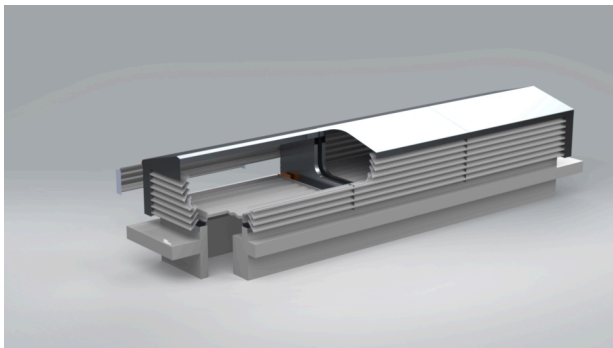
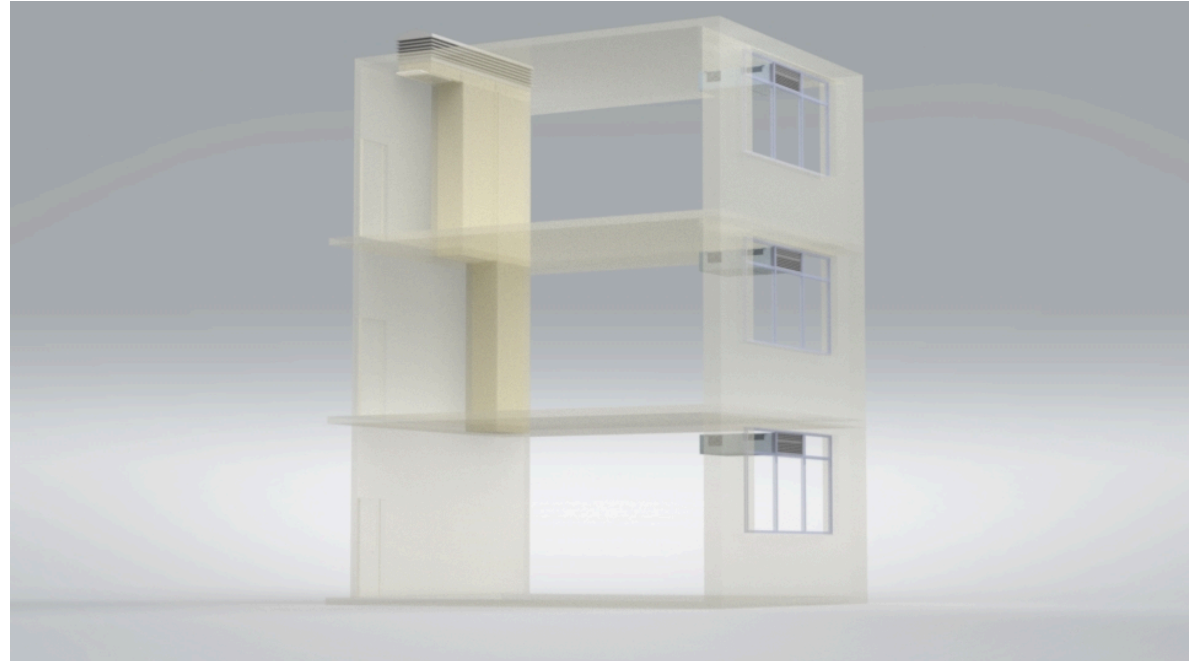
VENTILATION PRINCIPLES

Completed Integrated Solution

As ventilation strategies become more complex under CF25 and future DfE guidance, Gilberts is extending its offer beyond individual units to provide fully coordinated systems suitable for multi-storey education buildings. In addition to the MFS-HR, Gilberts has developed a dedicated “chimney” penthouse solution that manages vertical exhaust ventilation across multiple floors without reliance on shared corridors or central ductwork.

This chimney-based approach allows extract air from each teaching space to rise through a continuous, contained shaft before discharge at roof level, mirroring the natural stack effect used in traditional Victorian chimneys. When MFS-HR units are closed or operating in recirculation-safe modes, the penthouse opening provides an independent route for warm, stale or pollutant-laden air to be drawn upward and expelled, maintaining air quality and integrity between floors. Each space is thus afforded its own direct exhaust path, reducing the risk of cross-contamination and supporting fire, acoustic and hygienic separation.

By combining façade-based hybrid ventilation with vertical exhaust infrastructure, Gilberts can support complete ventilation strategies for DfE-specified schools, from single classrooms to whole-building systems. This integrated capability enables design teams to demonstrate compliance across air quality, overheating mitigation, acoustic performance and natural/passive ventilation principles, whilst simplifying coordination between architecture, structure and services.



Ready to Deliver DfE **Compliant Ventilation?**

Technical guidance, specification support and project integration, from concept to commissioning with Gilberts

The Mistrale Fusion Deo MFS-HR, alongside Gilberts' integrated chimney and façade ventilation solutions, has been developed to support the specific environmental and compliance demands of DfE CF25 projects. Our technical team is available to assist with early-stage design, coordination and specification.

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BIM models, performance data and CPD sessions are available on request.

