

A Breathing Buildings Guide to BREEAM credits available for non-domestic buildings using e-stack or NVHR systems

Breathing Buildings are often approached for advice about BREEAM Credits available for buildings which use our unique hybrid ventilation systems.

This document indicates which credits should be attainable when a Breathing Buildings e-stack or NVHR system is used. It has been written in conjunction with *BREEAM UK New Construction Non-Domestic Buildings (United Kingdom) Technical Manual SD5076 – 5.0 – 2014*.

An introduction to BREEAM

BREEAM stands for *Building Research Establishment Environmental Assessment Method*. It was first published by the BRE in 1990, and is one of the most well-respected methods of assessing and certifying the sustainability of buildings around the world – but particularly in the UK.

The BREEAM process evaluates the design, procurement, construction and operation of a development against targets that are based on performance benchmarks. Assessments are carried out by independent, licensed assessors, and developments are rated and certified on a scale of:

- Pass
- Good
- Very Good
- Excellent
- Outstanding



Where does Breathing Buildings fit in?

BB engineers have assessed that our hybrid natural ventilation systems can help achieve credits in the following categories.

Hea 02 Indoor Air Quality

- 1 Credit - Ventilation

Adequate fresh air ventilation rates are designed for in accordance with BB101 for teaching spaces and CIBSE Guide A, or other specific industry guidelines, for other types of space, on a project-by-project basis.

The assessment is divided into 10 categories:

- Management
- Health & Wellbeing
- Energy
- Transport
- Water
- Materials
- Waste
- Land Use & Ecology
- Pollution
- Innovation

Each category is sub-divided into targets.

When a target is reached, credits are awarded.

CO2 sensors are provided with every e-stack or NVHR system; these are linked back to local control which controls any automated vents in the space. Where manually opening windows are present, an indicator light indicates when it is advisable for occupants to open the windows.

➤ *1 Credit - Adaptability – Potential for natural ventilation*

Breathing Buildings provide different hybrid ventilation systems to suit either single-sided or cross-flow applications. The recommendation of each system is in accordance with the room depths advised in CIBSE AM10. All spaces are designed to meet the required thermal comfort conditions and ventilation rates.

Most e-stack systems have the functionality for mechanical boost ventilation in peak summer. For the purposes of BREEAM compliance, the client can request that the use of this function be limited to less than 5% of the occupied year.

User control is typically provided by advising the use of manual opening windows to complement e-stack or NVHR systems. A second level of user control is offered by the 'timed max vent' button on the user interface. A further level of user control may be added by linking the ventilation system (including the temperature and CO2 sensors) to the BMS another level of user control can also be provided to adjust setpoints.

The e-stack system is designed to mitigate cold draughts and this is automatically controlled by the integral controller. The façade openings are usually either under manual occupant control or actuated – enabling higher ventilation rates to prevent summertime overheating or remove odours.

Hea 04 Thermal comfort

➤ *1 Credit – Thermal Modelling*

Breathing Buildings use 4DFlo dynamic thermal modelling simulation software to ensure that each space meets the overheating criteria set out in CIBSE TM52.

Compliance can also be demonstrated with CIBSE Guide A (for non-education) and BB101 (for schools). 4DFlo has been written in accordance with the methodology set out in CIBSE AM11.

➤ *1 Credit – Adaptability for a Future Climate Change Scenario*

If requested, Breathing Buildings can use 4DFlo dynamic thermal modelling simulation to demonstrate overheating performance in a future climate scenario.

➤ *1 Credit – Thermal Zoning and Controls*

Breathing Buildings' e-stack systems are controlled by an integral controller which responds to internal temperature, internal CO2 and external temperature, which reacts to setpoints which reflect those simulated in our 4DFlo dynamic thermal modelling. Each room reacts independently to its own internal conditions.

In each room, occupants are provided with an override switch which can turn the system off and if desired can also be provided with a boost or purge button.

System interaction is often considered with heating and cooling systems where either dead bands are agreed for temperature setpoints or the e-stack controller can control the heating and/or cooling in the spaces.

Once the building is occupied, Breathing Buildings are able to offer training to the occupants and/or facilities managers in how to operate their ventilation system.

Ene 04 Low Carbon Design

- *1 Credit – Passive Design Analysis*

Breathing Buildings can support architects and design teams with dynamic thermal modelling of e-stack systems at the Concept Design stage to inform suitable passive design solutions.

- *1 Credit – Free Cooling*

The control strategy for all e-stack systems incorporates a night-cooling strategy, by using automated opening to provide natural ventilation overnight. The dynamic thermal modelling undertaken at the design stage reflects this strategy.

Man 04 Commissioning and handover

- *1 Credit - Commissioning and testing schedule and responsibilities*

Breathing Buildings carry out full final inspection of all installations and can offer seasonal commissioning of the system.

- *1 Credit - Handover*

Breathing Buildings deliver a full Operation and Maintenance manual to every client following completion of final inspection. In addition, a client demonstration service is offered either to the contractor, or to the end client, free of charge on all projects.

There are numerous other parts of the BREEAM process where using e-stack or NVHR hybrid ventilation systems should help towards attaining other BREEAM credits. Some examples include;

Hea 05 Acoustic performance & Pol 05 Noise attenuation

All e-stack equipment conforms to acoustic requirements of BB93 in terms of cross talk and fan noise. Where extra attenuation is required between the interior and exterior, Breathing Buildings offer a range of project specific solutions.

This document was updated 18th April 2017 by Dr Owen Connick – Consulting Manager

More information on BREEAM can be found at www.breathingbuildings.com/knowledge/BREEAM or www.breem.com