

Hea02

Ventilation

Ventilation strategy

Actions:

- i. Devise a ventilation strategy that complies with BREEAM standards which outlines the type of ventilation and locations of intakes and exhausts.

Ventilation design

The building should be designed to **minimise the indoor concentration and recirculation** of pollutants in the building by following the below actions:

- Provide **fresh air** into the building in accordance with the criteria of the relevant standard for ventilation
- Ventilation pathways are designed to minimise the ingress and build-up of air pollutants inside the building
- Where present, HVAC systems must incorporate **suitable filtration** to minimise external air pollution, as defined in BS EN 16798-3:2017. The specified filters should achieve supply air classification of **at least SUP 2**.
- Areas of the building subject to **large and unpredictable** or variable occupancy patterns have carbon dioxide (**CO₂**) or air quality sensors specified and:
 - o In mechanically ventilated buildings or spaces: sensors are linked to the **mechanical ventilation** system and provide demand-controlled ventilation to the space
 - o In naturally ventilated buildings or spaces: sensors either have the ability to **alert** the building owner or manager when CO₂ levels exceed the recommended set point, or are linked to controls with the ability to adjust the quantity of fresh air, i.e. **automatic opening windows** or roof vents
- For naturally ventilated or mixed mode buildings, the design demonstrates that the ventilation strategy provides **adequate cross flow** of air to maintain the required thermal comfort conditions and ventilation rates in accordance with CIBSE AM10.

Location

Locations of **ventilation intakes and airflow pathways** should be designed in accordance with any or a combination of the following methods:

- Locating the building's air **intakes and exhausts**, in relation to each other and sources of external pollution, in accordance with the following best practice as appropriate:
 - o PD CEN/TR 16798-4:2017
 - o BRE FB 30 Ventilation for healthy buildings: Reducing the impact of urban air pollution (2011)

Note: This document is intended as guidance only. Consult your BREEAM AP or Assessor to ensure compliance is achieved.

- BRE IP 9/14 Locating ventilation inlets to reduce ingress of external pollutants into buildings, as appropriate
- CIBSE TM21.
- Pollutant dispersion modelling can be used to inform the location of the building's air intakes and exhausts in relation to each other and sources of external pollution. This can be achieved using either wind tunnel modelling or numerical modelling. Pollutant dispersion modelling in urban areas is complex, so it is important that the person carrying out the modelling is a competent individual.
- Positioning the building's air intakes and exhausts at least 10m of horizontal distance apart. Positioning intakes at least 10m horizontal distance from sources of external pollution (including the location of air exhausts from other buildings). The building's air intakes and exhausts should be located to reduce the risk of the intake air being contaminated by the exhausts. Exhausts or other pollutant sources should not be discharged into enclosed spaces, such as courtyards, in which intakes are also located.

Sources of external pollution may include any of the following:

- Highways and the main access roads on the assessed site
- Car parks, delivery and vehicle waiting bays
- Other building exhausts, including from building services plant industrial or agricultural processes.

Common pollutants discharged from these sources are covered by the UK Air Quality Strategy and include: benzene, 1,3-butadiene, carbon monoxide, lead, nitrogen dioxide, ozone, particles (PM10, PM2.5), polycyclic aromatic hydrocarbons and sulphur dioxide and those from all types of industrial processes covered by the Health and Safety Executive (HSE).

Service and access roads with **restricted and infrequent access** (for example roads used only for waste collection) are unlikely to represent a significant source of external pollution. These roads can therefore be **excluded** from the criteria of this issue. This does not include vehicle pick-up, drop-off or waiting bays.

Where **significant levels of gaseous pollutants** such as nitrogen dioxide are identified in the outdoor air, as in an **Air Quality Management Area (AQMA)**, the use of appropriate **gas phase filtration** in the building ventilation system should be considered.

Design teams must ensure that **filter performance** is appropriate for the pollutant conditions experienced at the site.

The design of **naturally ventilated buildings** should minimise the build-up of air pollutants. Ventilation intakes and airflow pathways should be designed using the following methods:

- Following guidance given in:
 - BRE FB 30 Ventilation for healthy buildings: Reducing the impact of urban air pollution (2011),
 - BRE IP 9/14 Locating ventilation inlets to reduce ingress of external pollutants into buildings (2014), and,
 - CIBSE TM21 Minimising pollutants at air intakes (1999), as appropriate.

These give guidance on **ventilation strategies**, and the optimum location of ventilation inlets, openable windows, and trickle and background ventilators to reduce ingress of external pollutants into buildings.

- Positioning openable windows/ and background ventilators over at **least 10m** of horizontal distance from sources of external pollution (including the location of any building-related air exhausts).

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Consideration

Included within Strategy

Is the building naturally or mechanically ventilated?

Are there openable windows?

If naturally ventilated, is there adequate cross flow?

What are the sources of external pollution?

Where are the intakes and exhausts located?

- Are they 10m apart and 10m from external pollution sources?

Is the site located in an Air Quality Management Area (AQMA)?

If mechanically ventilated, is there suitable filtration?

Are CO₂ or air quality sensors necessary?

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