

Clean Air

Healthy

Credit: 10

Points: 2

Outcome

Pollutants entering the building are minimised, and a high level of outdoor air is provided to ensure levels of indoor pollutants are maintained at acceptable levels.

Criteria

Minimum Expectation	Nil	<ul style="list-style-type: none"> Levels of indoor pollutants are maintained at acceptable levels. A high level of outdoor air is provided. Pollutants entering the building are minimised.
Credit Achievement	2 points	<p>In addition to the <i>Minimum Expectation</i>:</p> <ul style="list-style-type: none"> The building's ventilation systems allow for easy maintenance. A high level of outdoor air is provided.

Additional information

Stage implementation

Strategy	Brief	Concept	Design	Tender	Construction	Handover	Use
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Synergies with other credits

- Amenity and Comfort
- Verification and Handover

Sustainable Development Goals

- Goal 3 (Good Health and Wellbeing)

Relevant reporting initiatives

- None

Regularly occupied areas

This credit applies to all regularly occupied areas in the building – those continuously occupied or occupied for more than two hours (previously known as 'primary' and 'secondary' spaces) including living and sleeping areas. Areas that are either transient or accessed intermittently such as corridors, storage, back of house or plant rooms can be excluded. Spaces can also be excluded if the use of the space (for example, a laboratory) justifies specific ventilation conditions – a Technical Question must be submitted to the

NZGBC for confirmation. Compliance is required to be demonstrated across at least 95% of the regularly occupied areas for this credit to be achieved.

Requirements

Minimum Expectation

The project must comply with **all three** of the following criteria:

- Ventilation System Attributes
- Provision of Outdoor Air
- Exhaust or Elimination of Pollutants

Ventilation System Attributes

Separation from pollutants

Ventilation systems must be designed to comply with ASHRAE Standard 62.1:2013 or AS 1668:2012 (whichever is greater) regarding minimum separation distances between pollution sources and outdoor air intakes.

If using ASHRAE Standard 62.1:2013, compliance is to be demonstrated in accordance with the distances specified in Table 5.5.1 of the Standard. Analytical solutions are also acceptable by following the example provided within Appendix F of ASHRAE Standard 62.1: 2013.

Diversity factors cannot be applied in meeting this credit.

Cleaning ductwork

All new and existing ductwork that serves the building must be cleaned prior to occupation in accordance with a recognised Standard. This includes all ductwork in the base building that serves the building from the air handling unit(s) to the supply vents. If no ductwork exists, these requirements are deemed to be met.

See *Guidance* for recognised Standards.

Provision of Outdoor Air

There are two pathways projects can pursue to demonstrate compliance, as described below:

Comparison to Industry Standards	<p>The building must provide a 50% improvement of outdoor air required by NZS 4303:1990 or AS 1668.2:2012 to each space in the regularly occupied areas.</p> <p>To demonstrate compliance, the HVAC system must be clearly sized to accommodate the increased outdoor air rates. The project must use the design occupancy, where known, rather than the default occupancy when calculating the required rates.</p> <p>The default occupancy is to be determined by the project team – any assumptions made must be justified within the Submission. Where the occupant density is unknown, projects must utilise the occupancy rates prescribed within Table 2.1 NZS 4303:1990 or Table A1 Appendix A of AS 1668.2:2012.</p> <p>Demand controlled ventilation is acceptable for energy efficiency performance.</p>
Performance based approach	<p>For this option, the system must be capable of providing enough outdoor air to maintain carbon dioxide (CO₂) levels at or less than 800ppm within each space in the regularly occupied areas at all times in the design occupancy period.</p> <p>The system must continuously measure the concentration of CO₂ within the breathing zone of each space during occupancy hours. The system must then adjust the amount of outdoor air to each space</p>

(up to the maximum design outdoor air quantity) to ensure that CO₂ levels are maintained below the stipulated ppm threshold.

Compliance with this approach is to be demonstrated through the use of dynamic energy modelling to at least 95% of the regularly occupied areas.

Zoning the system

CO₂ sensors shall be located so that they provide accurate representative readings of the CO₂ concentrations in occupied spaces. Project teams must provide detailed drawings and justification for the chosen locations of the CO₂ monitoring systems. CO₂ sensors must be located in each individually controlled supply air zone so that they provide accurate representative readings of the CO₂ concentrations in occupied spaces.

Modifying the air quality threshold

If appropriate, the project may nominate alternative thresholds from ASHRAE 62.1:2013. The justification must be accompanied with documentation from a recognised Standard or peer reviewed research.

Exhaust or Elimination of Pollutants

All outside air entering an occupied zone within a building must have a minimum level of filtration in accordance with section 2.5 of AS 1668.2:2012.

It must be demonstrated that pollutants from printing and photocopying equipment, cooking processes and equipment are limited from the regularly occupied areas by either:

- Removing the source of pollutants
- Exhausting the pollutants directly to the outside.

For the first option, sources of pollutants, such as printing or photocopy equipment, kitchen stoves or vehicles, must be compliant with minimum emissions standards or not be present within the regularly occupied areas.

For the second option, specified sources of pollutants shall be exhausted directly to the outside of the project in accordance with a recognised Standard, and/or physically separated from occupants.

Project teams are required to justify how provision for Cold Shell spaces has been provided based on building types and anticipated use.

See *Guidance* for relevant Standards.

Credit Achievement

In addition to the *Minimum Expectation*, the project must comply with **both** of the following criteria:

- Ventilation Systems Attributes
- Provision of Outdoor Air

Ventilation System Attributes

Any mechanical ventilation system within the building, whether existing or new, must provide adequate access to both sides of all moisture and debris-catching components for maintenance within the air distribution system.

Where it can be demonstrated that it is not possible to provide adequate access for cleaning and maintenance purposes [for example, ducted split system fan coil units (DX split/VRF/VRV)], the following requirements apply:

- Design teams may provide access to the upstream side of fan coil units where the coils are protected by a filter rated to the maximum performance for that application and no less than G2 and:
 - Upstream Air Handling Units (AHUs) managing the primary outside air treatment have a minimum filter rating in accordance with table 2.1 of AS 1668.2:2012

- Provide heating only
- Provide cooling only with the coil assembly no more than 4 rows deep
- Provide dual heating/cooling with the coil assembly no more than 4 rows deep
- For fan coil units or air handling units located within a ceiling void, in addition to the above criteria, the project team must fully demonstrate safe access for cleaning and maintenance. This may include:
 - Access panels in unit / ductwork is in close proximity to the coil to be cleaned
 - Access panels in the ceiling below the unit is in close proximity to the unit / ductwork access panel
 - The upstream surface of the coil must be accessible within 1m of the ceiling panel

Provision of Outdoor Air

Comparison to Industry Standards – non-residential buildings

The building must provide a 100% improvement of outdoor air required by NZS 4303:1990 or AS 1668.2:2012 to each space in the regularly occupied areas.

To demonstrate compliance, the HVAC system must be clearly sized to accommodate the increased outdoor air rates. The project must use the design occupancy, where known, rather than the default occupancy when calculating the required rates.

The default occupancy is to be determined by the project team – any assumptions made must be justified within the Submission. Where the occupant density is unknown, projects must utilise the occupancy rates prescribed within Table 2.1 NZS 4303:1990 or Table A1 Appendix A of AS 1668.2:2012.

Demand controlled ventilation is acceptable for energy efficiency performance.

Performance based approach

For this option, the system must be capable of providing enough outdoor air to maintain carbon dioxide (CO₂) levels at or less than 700ppm within each space in the regularly occupied areas at all times in the design occupancy period.

The system must continuously measure the concentration of CO₂ within the breathing zone of each space during occupancy hours. The system must then adjust the amount of outdoor air to each space (up to the maximum design outdoor air quantity) to ensure that CO₂ levels are maintained below the stipulated ppm threshold.

Compliance with this approach is to be demonstrated through the use of dynamic energy modelling to at least 95% of the regularly occupied areas.

Zoning the system

CO₂ sensors shall be located so that they provide accurate representative readings of the CO₂ concentrations in occupied spaces. Project teams must provide detailed drawings and justification for the chosen locations of the CO₂ monitoring systems. CO₂ sensors must be located in each individually controlled supply air zone so that they provide accurate representative readings of the CO₂ concentrations in occupied spaces.

Modifying the air quality threshold

If appropriate, the project may nominate alternative thresholds from ASHRAE 62.1:2013. The justification must be accompanied with documentation from a recognised Standard or peer reviewed research.

Submission content

Submissions for this credit must contain:

- **Submission form**
- **Evidence** to support claims made in the submission

Recommended evidence:

- Mechanical drawings for each ventilated space
- For naturally ventilated buildings, provide drawings of openings and opening schedule.
- Extract from the ventilation system specification for each system
- Extracts from the Environmental Management Plan that specify ventilation cleaning
- Extract from the Commissioning Report demonstrating that the HVAC and CO₂ monitoring systems are operating as intended. For naturally ventilated areas, this is only relevant where automation systems and the like are included.

Alternate documentation can also be used by project teams to demonstrate compliance.

The recommended evidence listed above is applicable to the as built submission. See the *Design Assessment* section in the Introduction for more information on submitting evidence for the Design assessment.

The key requirement is that evidence is provided to support each claim made within the Submission form.

Guidance

Outdoor air intakes

All openable windows, doors, openings, vents, grilles, and skylights are considered outdoor air intakes for purposes of this credit and must be considered in the demonstration of compliance.

Provisions of Outdoor Air – Natural Ventilation

Where ventilation is by natural means, compliance with AS 1668.4-2012 must be verified to each space in the regularly occupied areas under all likely weather conditions. If any mechanical ventilation is present, other than ceiling fans, the space is not considered naturally ventilated.

Relevant standards

Standards for the 'Ventilation System Attributes' criterion include:

- AIRAH HVAC 2010 Hygiene Best Practice Guideline.
- ASHRAE Standard 62.1:2013, Section 5.
- ACR 2006 Assessment, Cleaning and Restoration of HVAC Systems.
- SMACNA IAQ Guidelines for Occupied Buildings under Construction.

Standards for the 'Provision of Outdoor Air' criterion include:

- AS1668.2:2012 The use of ventilation and air-conditioning in buildings - Mechanical Ventilation in buildings.
- AS1668.4:2012 The use of ventilation and air-conditioning in buildings - Natural Ventilation of buildings.
- ASHRAE 62.1:2013 Ventilation for Acceptable Indoor Air Quality.
- NZS 4303:1990 Ventilation for Acceptable Indoor Air Quality.

Standards for the 'Exhaust or Elimination of Pollutants' criterion include:

- AS1668.2:2012 The use of ventilation and air-conditioning in buildings – Mechanical Ventilation in buildings.
- AS1668.4:2012 The use of ventilation and air-conditioning in buildings - Natural Ventilation of buildings.
- RAL UZ 171:2012 and RAL UZ 205: 2017 Basic Criteria for Award of The Environmental Label - Office Equipment with Printing Functions (Printers, Copiers, Multifunction Devices).
- ECMA-328 Determination of Chemical Emission Rates from Electronic Equipment.
- GGPS.003 Greenguard Indoor air Quality (IAQ) Standard for Office Equipment (Hardcopy Devices).

Tenant spaces – Ventilation System Attributes

Tenant Supplementary Systems, such as water cooled package units serving meeting rooms or communications rooms, where the design, maintenance and ownership are determined and controlled by the Tenant can be excluded. For further guidance regarding

tenant supplemental units, refer to the NABERSNZ rules for determining base building and tenant allocation. Where NABERSNZ assesses a system as a tenant load, these systems can be excluded from the credit, where NABERSNZ assesses a system as base building, these systems must be shown to be compliant for the credit to be awarded. Systems which are excluded for the purposes of a NABERSNZ base building rating may also be excluded for this credit.. These rules can only be applied for commercial building types . All base building systems installed must comply with credit criteria 9.1.3.

In addition, where the expected base building design, as described in the Building User Guide or Tenancy Fitout Guide requires the installation of moisture or debris generating components (for example chilled beams, fan coil units or heating coils within VAV boxes) this credit cannot be claimed.

Tenant spaces – Provision of Outdoor air

Project teams to demonstrate compliance with credit based on intended occupancy rate. Where the occupancy rate is different to Table 2.1 NZS 4303:1990, the design team shall demonstrate the basis for the occupancy rate.

Tenant spaces – Exhaust or Elimination of Pollutants

Project teams are required to demonstrate provision for Cold Shell spaces has been provided based on building class.

Supporting information

The following resources supporting this credit:

- AS 1668.2:2012
- ASHRAE Standard 62.1:2013
- AIRAH HVAC 2010 Hygiene Best Practice Guideline
- SMACNA IAQ Guidelines for Occupied Buildings under Construction.