



# Credit Interpretation Request

## 1126 : Demonstrating compliance to EQp1 for MURBs

**Final Ruling Date** 4/30/2014

**Rating System** LEED Canada for New Construction and Major Renovations Version 2009

**Credit Category** Indoor Environmental Quality (EQ) IEQp1

Minimum IAQ Performance

### Subject

Demonstrating compliance to EQp1 for MURBs

### Summary Question

Please provide clarification for compliance to EQp1 (Minimum IAQ Performance) for Multi-unit Residential Buildings (MURBs).

### Context and Arguments

N/A

### Final Ruling

The LEED Canada rating systems are intended to lead the market transformation in Canada to promote the creation of buildings that provide an indoor environment that is healthier and more productive compared to the common stock of buildings. Accordingly, one of the prerequisites in the LEED Canada rating systems is to provide superior air quality for all building occupants using industry recognized ventilation standards such as ASHRAE 62.1.

Considerations for EQp1 compliance:

The following provides clarification on how compliance with EQp1 can be achieved for multi-unit residential buildings (MURBs) with specific ventilation systems common to some markets in Canada.

Three key pieces of information should be considered when designing ventilation systems for MURBs.

1. ASHRAE 62.1-2004 (including addendum h) and ASHRAE 62.1-2007 require that residential spaces follow the Ventilation Rate Procedure, as per Section 6.2 of the standard. Previous to the release of addendum h of ASHRAE 62.1-2004, residential spaces needed only to comply with Table E-2 of Appendix E, which required only minimum bathroom and kitchen exhaust rates; this requirement has been superseded by addendum h which was released in January 27, 2007. Note that the LEED Canada NC 1.0 Addendum requirements for EQp1 are to meet the minimum requirements of standard ASHRAE 62.1-2004 and Addenda approved at the time the building was permitted.

2. The Ventilation Rate Procedure requires ventilation air in the breathing zone of the occupiable space or spaces in a zone (Vbz), as per Section 6.2.2.1. ASHRAE Interpretation IC 62.1-2007-20 clarifies that ventilation must be supplied or distributed to each occupiable space or spaces within a ventilation zone. However, ASHRAE Interpretation IC 62.1-2007-22 (which was also previously released as IC-62.1-2004-19) also clarifies that outdoor air can be pushed or pulled into the breathing zone.

3. The ASHRAE 62.1 Standard requires that ventilation be provided during all occupied hours. Intermittent ventilation is only permitted as per the Short Term Conditions clause in Section 6.2.6.2.

Based on the above criteria and other LEED Canada requirements, the following considerations must be taken into account to design systems in compliance with EQp1:

- Except as per Section 5.1 of ASHRAE 62.1-2004 and 2007 for Natural Ventilation, the Standard does not have any provisions for compliance using the Ventilation Rate Procedure without the use of mechanical ventilation equipment. Therefore, designs that do not use any active ventilation or that do not meet the requirements of Section 5.1 for Natural Ventilation cannot claim compliance with the Standard if air is not mechanically supplied or distributed to each occupiable space within a suite.
- Intermittent use of exhaust fans that are intended to provide ventilation may not comply with the Standard. The exception is when the operation of the fans meets the requirements of Section 6.2.6.2 (Short Term Conditions), and the fans are hard-wired or ensured through other means to operate this way.
- Supply or distribution of ventilation air can be pushed or pulled into the suite and into each occupiable space, provided that an appropriate zone air distribution effectiveness (Ez) value is used, as per Table 6-2 of ASHRAE 62.1. If the values in Table 6-2 are not adequate to describe the delivery effectiveness of ventilation air to the occupiable spaces, then ASHRAE Standard 129 may be used in lieu of Table 6-2, as per note 5 of the Table.
- Designs that use corridor pressurization or through-the-wall or through-the-slab ventilation to get air into the suites must still meet the requirements for distributing ventilation air to each occupiable space within each suite. However, note that as per EQp2 (Environmental Tobacco Smoke (ETS) Control), for buildings that do not have "no smoking" policies it is unlikely that projects will meet the requirements of EQp2 AND EQp1 using ventilation systems that rely on corridor pressurization. Note that these systems may also conflict with other code requirements, such as fire separations, etc.
- As per Section 7.2.2 of Standard 62.1 2004 or 2007 (note that compliance with this section is also a requirement of EQp1), ventilation systems shall be tested and balanced to verify conformance with the total outdoor airflow and space supply airflow requirements of the Standard. This means that designs that use corridor pressurization or through-the-wall or through-the-slab ventilation must be balanced to ensure that the outdoor airflow requirements are being met in each suite. Designs should consider the viability of meeting this clause early in design, rather than during commissioning.
- As per EAp1 (Fundamental Commissioning of Building Energy Systems), ventilation systems must be commissioned, including all systems that distribute outdoor air to and throughout the suite.

Examples of mechanical ventilation designs that would be problematic in demonstrating compliance for EQp1:

With the above considerations in mind, the following lists several examples of mechanical ventilation configurations that would be problematic in demonstrating compliance with EQp1. These examples assume a high-rise multi-unit residential tower applying for LEED Canada NC 2009, with a central make-up air unit (MAU) and suites with no mechanical cooling and only baseboards for heating.

1) Delivery of air from an MAU only to corridors with occupant-controlled (switched) suite exhaust fans located in bathroom(s) and kitchen. Regardless of the amount of outdoor air delivered by the MAU, exhaust fans would not remain on long enough to satisfy ASHRAE 62.1-2007 stipulations. Further, it is unlikely that it could be verified that a sufficient quantity of the air delivered to corridors would migrate into the adjacent suites to meet the suite's ventilation requirements.

2) Delivery of air from an MAU ducted to suites (e.g., behind refrigerator) with occupant-controlled (switched) suite exhaust fans located in bathroom(s) and kitchen. As with the above configuration, exhaust fans would not remain on long enough to satisfy ASHRAE 62.1-2007 stipulations.

3) Delivery of air from an MAU ducted to suites at a single location (e.g., behind refrigerator) with continuously running suite exhaust fans located in bathroom(s) and kitchen. Assume continuous exhaust flows are as dictated by ASHRAE 62.1-2007 (i.e., 25 cfm per bathroom, 50 cfm per kitchen). If the exhaust does not pull sufficient air through all the enclosed regularly occupied rooms within the dwelling unit (i.e., Vbz of about 15 to 25 cfm per room, depending on the size of the room and number of people), the design would not be compliant. The following are specific cases that would not be compliant:

- a) A bedroom without an ensuite bathroom with continuous airflow exhaust to draw air through the bedroom would not be compliant.
- b) A 120 ft<sup>2</sup> bedroom having an ensuite bathroom with 25 cfm of continuous exhaust airflow may also not be compliant if the transferred make-up air from outside the bedroom short-circuits the bedroom through the bathroom fan (e.g., the bathroom is just around the corner from the entry to the bedroom). In this case, if the bedroom requires 17 cfm of outdoor air at the breathing zone but its zone air distribution effectiveness (Ez) is only 0.5 (from Table 6-2 "Makeup supply drawn in near to the exhaust and/or return location"), therefore 34 cfm of make-up air is required in the bedroom instead of 25 cfm as provided by the bathroom exhaust fan. Note that a transfer fan just above the bedroom door may present the same issues.

A configuration that meets the ASHRAE 62.1 requirements must deliver the required amount of outdoor air directly to each regularly occupied room to the breathing zone. As long as the delivered air is not short-circuited (i.e., with an Ez of 0.5), the continuous exhaust requirements for bathrooms and kitchens from Table 6-4 of ASHRAE 62.1-2007 will normally dictate the amount of total required outdoor air for the suite -- and prevent energy use from adversely increasing due to having to increase the ventilation levels.

This CIR clarification is only applied for the purposes of LEED Canada certification. The CaGBC is not the authority having jurisdiction for code compliance or other compliance purposes.

Please refer to CIR 1127 "Clarification for natural ventilation strategies" for additional guidance.

#### Additional Applicable Credits

Rating System	Version	Prerequisite/Credit
LEED Canada for New Construction and Major Renovations	1.0	IEQp1