

Issue: DS2021-023. The Petitioner, Pete Quintela, Senior Code Officer is seeking a declaratory statement with regard to whether natural ventilation can be used to provide outdoor air for an occupied space while it is mechanically cooled.

Petitioner seeks clarification for the following Question:

Can natural ventilation (via openable windows) be used to provide outdoor air for an occupied space while it is mechanically cooled and still meet the sealed building thermal envelope requirements of the Energy Conservation Code, Section C402.5?

Background:

The Miami-Dade County, Regulatory and Economic Resources (RER), Building Code Administration Division (BCAD), is charged with the uniform enforcement of the Florida Building Codes throughout all municipalities **within the County**.

A tight building thermal envelope to keep conditioned air in and hot, humid air out is critical in South Florida (Climate Zone 1A). The **Energy Conservation Code** defines the **Building Thermal Envelope** as a boundary between conditioned space and any unconditioned space. The Florida Mechanical Code (FMC) 401.3, requires that building spaces must be ventilated during the periods the space is occupied. Additionally, (FMC) 401.2, requires that the ventilation to these spaces must be achieved by either natural or mechanical means.

During our visits to the municipalities, we often encounter construction plans for air-conditioned apartment buildings (R-2) greater than 3 stories, and the required outdoor air for the occupants is provided by natural ventilation (openable windows).

7th Edition (2020) Florida Building Code, Energy Conservation

Commercial Provisions

Section C202 - General Definitions

Air conditioning. The treatment of air so as to control simultaneously the temperature, humidity, cleanness and distribution of the air to meet the requirements of a conditioned space.

Building Thermal Envelope. The basement walls, exterior walls, floors, ceilings, roofs and any other building element assemblies that enclose conditioned space or provide a boundary between conditioned space and exempt or unconditioned space.

Continuous Air Barrier. A combination of materials and assemblies that restrict or prevent the passage of air through the building thermal envelope.

Ventilation. The natural or mechanical process of supplying conditioned or unconditioned air to, or removing such air from, any space.

Ventilation Air. That portion of supply air that comes from outside (outdoors) plus any recirculated air that has been treated to maintain the desired quality of air within a designated space.

SECTION C101

C101.3. Intent. This code shall regulate the design and construction of buildings for the effective use and conservation of energy over the useful life of each building. This code is intended to provide flexibility to permit the use of innovative approaches and techniques to achieve this objective. **This code is not intended to abridge safety, health or environmental requirements contained in other applicable codes or ordinances.**

C402.5 Air leakage—thermal envelope (Mandatory).

The thermal envelope of buildings shall comply with Sections C402.5.1 through C402.5.8, or the building thermal envelope shall be tested in accordance with ASTM E779 at a pressure differential of 0.3 inch water gauge (75 Pa) or an equivalent method approved by the code official and deemed to comply with the provisions of this section when the tested air leakage rate of the building thermal envelope is not greater than 0.40 cfm/ft² (2.0 L/s · m²). Where compliance is based on such testing, the building shall also comply with Sections C402.5.5, C402.5.6 and C402.5.7.

C402.5.1. Air barriers.

A continuous air barrier shall be provided throughout the building thermal envelope. The air barriers shall be permitted to be located on the inside or outside of the building envelope, located within the assemblies composing the envelope, or any combination thereof. The air barrier shall comply with Sections C402.5.1.1 and C402.5.1.2.

Exception: Air barriers are not required in buildings located in *Climate Zone 2B*.

C402.5.1.1 Air barrier construction.

The *continuous air barrier* shall be constructed to comply with the following:

1. The air barrier shall be continuous for all assemblies that are the thermal envelope of the building and across the joints and assemblies.
2. Air barrier joints and seams shall be sealed, including sealing transitions in places and changes in materials. The joints and seals shall be securely installed in or on the joint for its entire length so as not to dislodge, loosen or otherwise impair its ability to resist positive and negative

C403.2.6 Ventilation.

Ventilation, **either natural or mechanical**, shall be provided in accordance with **Chapter 4 of the Florida Building Code, Mechanical**. Where mechanical ventilation is provided, the system shall provide the capability to reduce the outdoor air supply to the minimum required by Chapter 4 of the *Florida Building Code, Mechanical*.

Seventh Edition (2020) Florida Building Code, Mechanical

SECTION 401 - GENERAL

401.2 Ventilation required.

Every occupied space shall be **ventilated by natural means** in accordance with **Section 402**

or by mechanical means in accordance with **Section 403**. Where the air infiltration rate in a dwelling unit is less than 3 air changes per hour when tested with a blower door at a pressure of 0.2-inch water column (50 Pa) in accordance with Section R402.4.1.2 of the *Florida Building Code, Energy Conservation*, the dwelling unit shall be ventilated by mechanical means in accordance with Section 403. Ambulatory care facilities and Group I-2 occupancies shall be ventilated by mechanical means in accordance with Section 407.

401.3 When required. Ventilation shall be provided during the periods that the room or space is occupied.

SECTION 402 - NATURAL VENTILATION

[BG] 402.1 Natural ventilation.

Natural ventilation of an occupied space shall be **through windows, doors, louvers or other openings to the outdoors**. The operating mechanism for such openings shall be provided with ready access so that the openings are readily controllable by the building occupants.

[BG] 402.2 Ventilation area required.

The minimum openable area to the outdoors shall be 4 percent of the floor area being ventilated.

[BG] 402.3 Adjoining spaces.

Where rooms and spaces without openings to the outdoors are ventilated through an adjoining room, the opening to the adjoining rooms shall be unobstructed and shall have an area not less than 8 percent of the floor area of the interior room or space, but not less than 25 square feet (2.3 m²). The minimum openable area to the outdoors shall be based on the total floor area being ventilated.

Exception: Exterior openings required for ventilation shall be permitted to open into a thermally isolated sunroom addition or patio cover, provided that the openable area between the sunroom addition or patio cover and the interior room has an area of not less than 8 percent of the floor area of the interior room or space, but not less than 20 square feet (1.86 m²). The minimum openable area to the outdoors shall be based on the total floor area being ventilated.

SECTION 403 - MECHANICAL VENTILATION

403.1 Ventilation system.

Mechanical ventilation shall be provided by a method of supply air and return or *exhaust air* except that mechanical ventilation air requirements for Group R-2, R-3 and R-4 occupancies three stories and less in height above grade plane shall be provided by an exhaust system, supply system or combination thereof. The amount of supply air shall be approximately equal to the amount of return and *exhaust air*. The system shall not be prohibited from producing negative or positive pressure. The system to convey *ventilation air* shall be designed and installed in accordance with Chapter 6

403.2 Outdoor air required.

The minimum outdoor airflow rate shall be determined in accordance with Section 403.3.

Exception: Where the *registered design professional* demonstrates that an engineered ventilation system design will prevent the maximum concentration of contaminants from exceeding that obtainable by the rate of outdoor air ventilation determined in accordance with

Section 403.3, the minimum required rate of outdoor air shall be reduced in accordance with such engineered system design.

403.2.2 Transfer air.

Except where recirculation from such spaces is prohibited by Table 403.3.1.1, air transferred from occupiable spaces is not prohibited from serving as *makeup air* for required exhaust systems in such spaces as kitchens, baths, toilet rooms, elevators and smoking lounges. The amount of transfer air and *exhaust air* shall be sufficient to provide the flow rates as specified in Section 403.3.1.1. The required outdoor airflow rates specified in Table 403.3.1.1 shall be introduced directly into such spaces or into the occupied spaces from which air is transferred or a combination of both.

Staff Analysis

Question:

Can natural ventilation (via openable windows) be used to provide outdoor air for an occupied space while it is mechanically cooled and still meet the sealed building thermal envelope requirements of the Energy Conservation Code, Section C402.5?

Answer:

The answer to the Petitioner's question is yes. As per Section C403.2.6 Ventilation of the 7th Edition (2020) Florida Building Code (FBC), Energy Conservation and Section 401.2 Ventilation required of the 7th Edition (2020) FBC, Mechanical, natural ventilation meeting the specified requirements of Section 402 Natural Ventilation of the 7th Edition (2020) FBC, Mechanical is an acceptable method of ventilation for the building in question.