

**NC Department of Insurance  
Office of the State Fire Marshal - Engineering Division  
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**Ventilation Rate Requirements**

**Code:** 2018 Mechanical Code  
**Section:** 403.3

**Date:** March 18, 2019

**Question:**

Must the estimated maximum occupant load from Table 403.3.1.1 of the NC Mechanical Code always be used when determining the minimum required outdoor ventilation air requirements?

**Answer:**

No, not always. Section 403.3 requires that ventilation systems be designed to have the capacity to supply the minimum outdoor airflow rate determined in accordance with Table 403.3.1.1. The occupant density entries in Table 403.3.1.1 are based on empirical data and are reasonably accurate for the typical cases in each type of occupancy; however, there are actually three acceptable options.

Options:

- 1) Use the values in Table 403.3.1.1
- 2) The occupancy shall be determined by an approved engineering analysis.
- 3) Approved statistical data shall document the accuracy of an alternate anticipated occupant density. An example of this would be a factory setting where statistical data shows that the occupant load in the table is much higher than would be required for a particular industrial process.

**Follow-up Question #1:**

Can the ventilation amount being provided track the number of occupants that are actually in the space?

**Answer:**

Yes. Code section, **403.3.1.3 System operation**, certainly allows the required amount of ventilation to track the number of occupants actually present. The code gives no guidelines as to how the system does this, as that is the responsibility of the designer, but common industry methods include carbon dioxide sampling and infrared sensors. This section is assuming the ventilation is for the purpose of personnel; if exhaust/ventilation is required for purposes of hazardous materials, those more specific code sections need to be followed.