TO:	**ALL BUILDING DIVISION PERSONNEL**
FROM:	**DOUG WISE** **BUILDING DIVISION DIRECTOR**
PREPARED BY:	**BUILDING DIVISION**
SUBJECT:	**BLOWER DOOR TEST REPORTS** **(*Energy* Code Maximum Allowed Air Change Rates and *Mechanical* Code Minimum Required Air Change Rates)**
PPM #:	**PB-O-132**

ISSUE DATE	**EFFECTIVE DATE**
February 12, 2019	**March 21, 2019**

PURPOSE:

To provide guidance to plan review and inspections staff regarding the maximum allowed air-infiltration values, as well as the minimum air changes per hour required when verifying air-infiltration Blower Door Testing compliance with applicable regulations.

UPDATES:

Future updates to this PPM are the responsibility of the Director of the Building Division, Deputy Building Official, Assistant Deputy Building Official, or Codes Product & Training Supervisor, under the authority of the Director of the Building Division.

AUTHORITY:

Florida Building Code, Energy Conservation (FECC), as may be amended
- Section R303.4
- Section R402.4

Florida Building Code, Residential (FRC), as may be amended
- Section M1507.3
- Section M1506.2

Chapter 1, Administration – Palm Beach County Amendments to the Florida Building Code, as may be amended

DEFINITIONS:

ACH: Air Changes per Hour as tested at 0.2 inch w.g. (50 Pascals)
AHU: Air Handling Unit
BDT: Blower Door Test
SPF: Spray Poly-Foam Insulation
WHMV: Whole House Mechanical Ventilation

BACKGROUND:

A number of studies have demonstrated substantial energy savings may be achieved by tightening the building envelope. Consequently, the building codes have gradually included more and more restrictive requirements concerning the allowable air infiltration rates of the building thermal envelope. The 2014 FECC included mandatory air-leakage testing for all new residential construction, and on July 1, 2017, the testing requirement was implemented. It quickly became evident that the vast majority of structures were testing below the 'air infiltration' maximum threshold of 7-ACH, thus satisfying the Energy Code. On the downside, several houses have tested out so tight that they fall below the 3-ACH minimum required by the Mechanical Code to ensure good air quality. This result has been most prevalent in sealed-attic designs, therefore, it is now imperative that homes designed with sealed-attics also include a WHMV plan.

POLICY:

Plan Review and Inspection staff shall confirm the plans and construction of a dwelling unit are in compliance with both the Energy Code (air-infiltration test at less than 7-ACH) and the Mechanical Code (air-infiltration test at more than 3-ACH). Plan designs specifying a sealed-attic assembly must include a complete WHMV plan.

PROCEDURE:

Plan Review

1. Mechanical Plans Review shall confirm or verify the following information is provided on the plans prior to approval:

    a. Unvented attic designs typically have Blower Door Test (air infiltration rate) results less than 3-ACH (50), thus requiring "whole-house mechanical ventilation" (WHMV) per R303.4, 2017 FRC.

        R303.4 Mechanical ventilation. Where the air infiltration rate of a *dwelling unit* is less than 3.00 air changes per hour where tested with a blower door at a pressure of 0.2 inch w.c (50 Pa) in accordance with Section R402.4.1.2 of the *Florida Building Code, Energy Conservation*, the *dwelling unit* shall be provided with whole-house mechanical ventilation in accordance with Section M1507.3.

    b. WHMV systems shall be designed in accordance with M1507.3, 2017 FRC.

        M1507.3.1 System design. The whole-house ventilation system shall consist of one or more supply or exhaust fans, or a combination of such, and associated ducts and controls.

    c. Type of mechanical system design operation (continuous or intermittent).

        M1507.3.3 Mechanical ventilation rate. The whole-house mechanical ventilation system shall provide outdoor air at a continuous rate of not less than that determined in accordance with Table M1507.3.3(1).

Exception: The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25-percent of each 4-hour segment and the ventilation rate prescribed in Table M1507.3.3(1) is multiplied by the factor determined in accordance with Table M1507.3.3(2).

d. Required airflow rate based on selected operation type, per Table M1507.3.3(1)

TABLE M1507.3.3(1)
CONTINUOUS WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	0 – 1	2 – 3	4 – 5	6 – 7	> 7
	Airflow in CFM				
< 1,500	30	45	60	75	90
1,501 – 3,000	45	60	75	90	105
3,001 – 4,500	60	75	90	105	120
4,501 – 6,000	75	90	105	120	135
6,001 – 7,500	90	105	120	135	150
> 7,500	105	120	135	150	165

For SI: 1 square foot = 0.0929 m^2, 1 cubic foot per minute = 0.0004719 m^3/s.

TABLE M1507.3.3(2)
INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION RATE FACTORS[a, b]

RUN-TIME PERCENTAGE IN EACH 4-HOUR SEGMENT	25%	33%	50%	66%	75%	100%
Factor[a]	4	3	2	1.5	1.3	1.0

a. For ventilation system run time values between those given, the factors are permitted to be determined by interpolation.
b. Extrapolation beyond the table is prohibited.

e. Duct size, type and length (max) per M1506.2.

M1506.2 Duct length. The length of exhaust and supply ducts used with ventilating equipment shall not exceed the lengths determined in accordance with Table M1506.2.
Exception: Duct length shall not be limited where the duct system complies with the manufacturer's design criteria or where the flow rate of the installed ventilating equipment is verified by the installer or approved third party using a flow hood, flow grid or other airflow measuring device.

f. Damper design, location and power source as shown in WHMV plan.

2. Energy Form Review

a. Input parameters should specify the attic is Unvented.
b. Includes WHMV design in the equipment sizing calculation due to increased heat and humidity loads.

Inspections

1. Field Inspectors shall verify the following items at the appropriate inspection:

2. **Mechanical Rough** (604)
    a. Supply duct size and installation in accordance with plans.
    b. If the attic is Unvented, confirm plans show WHMV system design. If not, a Revision will be required (Field Revision may be acceptable per Mechanical Chief).

3. **Mechanical Final** (602)

    a. Installation is per WHMV system design in plans.
    b. Ventilation supply duct's final connection to AHU
    c. Damper type, location and power provisions
    d. Sign Permit Card with annotation "WHMV OK" so **Building Inspector will see it.**

4. **Building Final** (104)

    a. Utilizing the Blower Door Test form, confirm Blower Door Test result is **between** 3 and 7 ACH (50) (Energy Code Requirement, R402.4.1.2).
    b. If BDT result is **less than** 3 ACH (50), confirm Mechanical inspector signed and marked Permit Card with "WHMV OK" (Mechanical Code Requirement, FRC R303.4).

Note: If the results are outside the parameters above, or missing paperwork, the results shall be failed in accordance with PB-O-019. If it passes, retain paperwork and file appropriately.

DOUG WISE
BUILDING DIVISION DIRECTOR

Supersession History
1. PPM# PB-O-132, issued 3/21/19