Air Leakage and Ventilation

COURSE NUMBER
 # CILB 0614469
 # BCAIB 5009212 (1 Energy CEU)

PROVIDER NUMBER
 # 0001071

TIMOTHY G. DE CARION

CHIEF ENERGY CODE COMPLIANCE OFFICER

BROWARD COUNTY BOARD OF RULES AND APPEALS

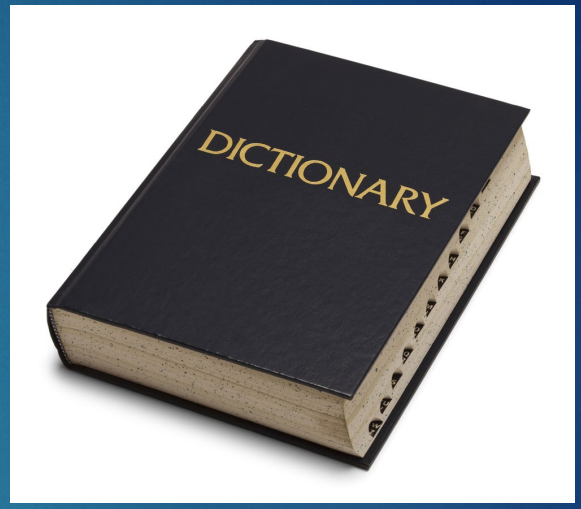
Air Leakage and Ventilation

TOPICS THAT ARE GOING TO BE COVERED

- Air Barrier Requirements
- Sealing the Air Barrier
- Openings into the Building
- Testing

Air Barrier Requirements

202-Definition: Air Barrier

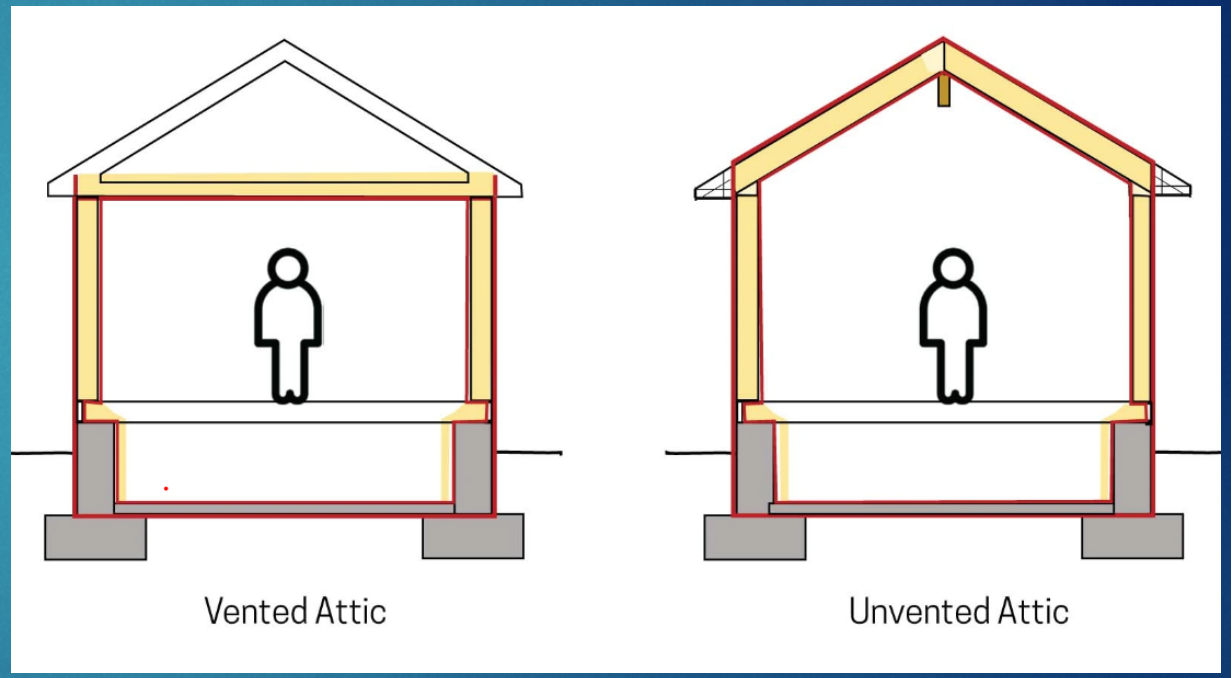


When in reference to the building envelope:
Air barriers comprise the planes of primary resistance to airflow between the interior spaces of a building and the outdoors and the planes of primary airflow resistance between adjacent air zones of a building, including planes between adjacent conditioned and unconditioned air spaces of a building.

Air Barrier Requirements

SIMPLY PUT:

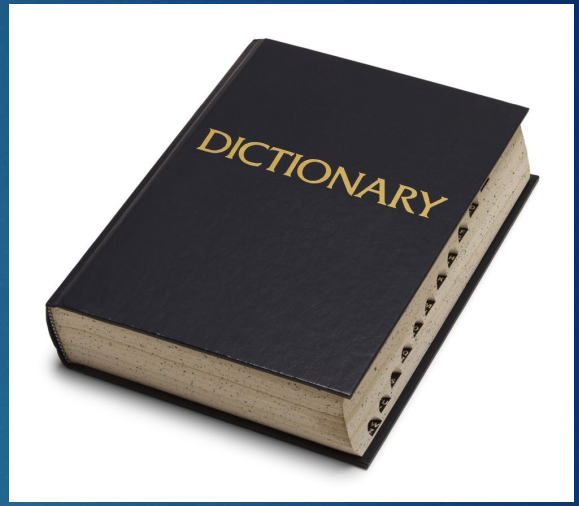
AIR BARRIERS CONTROL THE AMOUNT OF OUTSIDE AIR COMING INTO A BUILDING AND ALSO KEEP THE AMOUNT OF HEATED OR COOLED AIR INSIDE THE BUILDING



Air Barrier Requirements

202-Definition:

House wraps and taped and sealed drywall may constitute an air barrier but dropped acoustical tile ceilings (T-bar ceilings) may not. Batt insulation facings and asphalt impregnated fiberboard and felt paper are not considered air barriers.



Air Barrier Requirements

A DROPPED T-BAR CEILING OVER A CONDITIONED OFFICE SPACE

DOES NOT PROVIDE A TIGHT AIR BARRIER

Air Barrier Requirements

BAT INSULATION INSTALLED ON T-BAR CEILINGS IS NOT AN AIR BARRIER

Example: Warehouse Office

C402.2.2 ROOF ASSEMBLY

INSULATION INSTALLED ON A SUSPENDED CEILING WITH REMOVABLE CEILING TILES SHALL NOT BE CONSIDERED PART OF THE MINIMUM THERMAL RESISTANCE OF THE ROOF INSULATION

Air Barrier Requirements

BATT INSULATION FACINGS ARE NOT CLASSIFIED AS AN AIR BARRIER

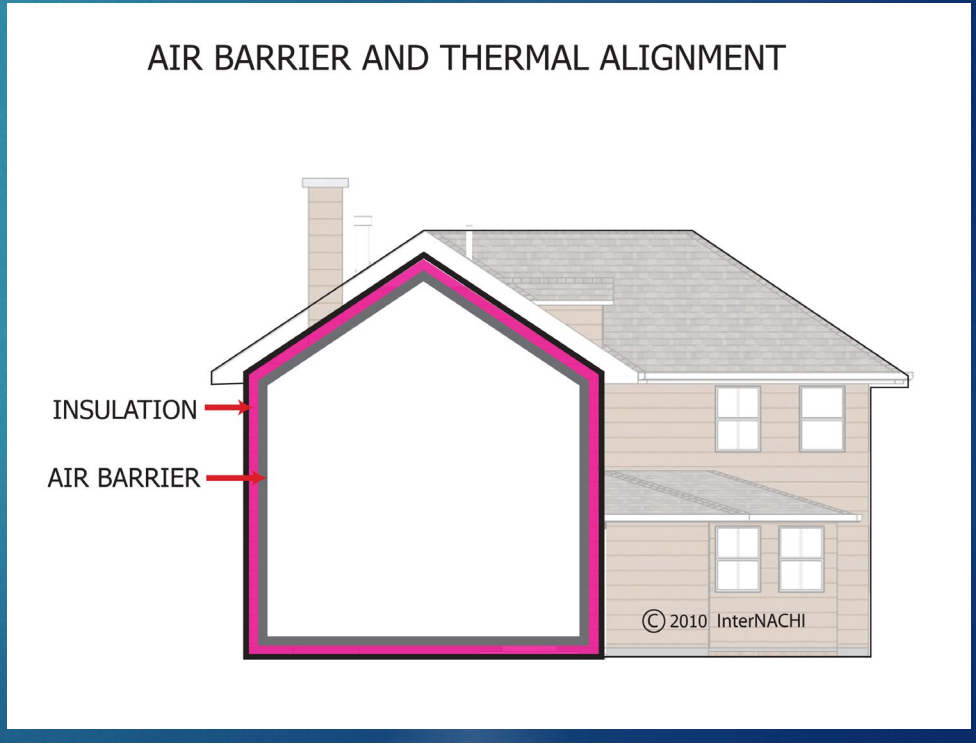
INSULATION MUST BE INSTALLED PER MANUFACTURERS INSTRUCTIONS

C303.2 INSTALLATION. *MATERIALS, SYSTEMS AND EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND THE FLORIDA BUILDING CODE, BUILDING.*

Air Barrier Requirements

C402.5.1 Air Barriers.
A continuous air barrier shall be provided throughout the building thermal envelope.

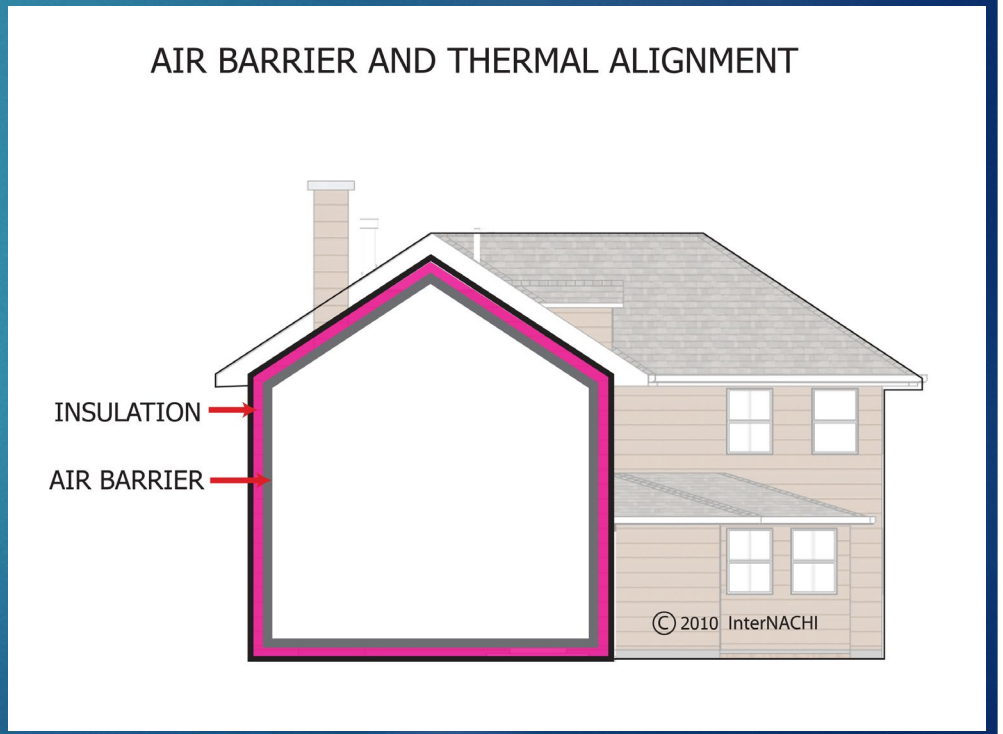
Remember:
Air Barriers are a Component of the Thermal Envelope



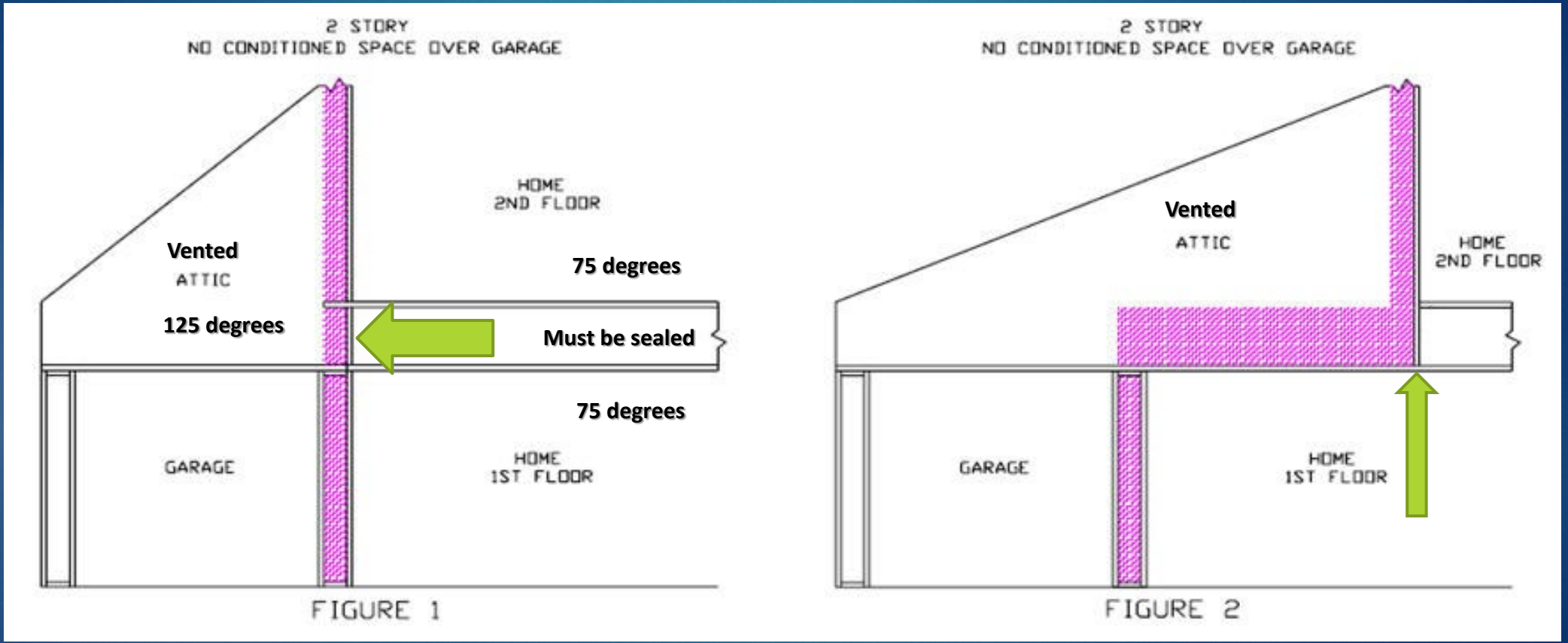
Air Barrier Requirements

C402.5.1 Air barriers.
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.

R402.4 Air Leakage (Mandatory)
The building thermal envelope shall be constructed to limit air leakage in accordance with the requirements of R402.1 though R402.5



Air Leakage Requirements



Sealing the Air Barrier

C402.5.1.2.1 MATERIALS.

MATERIALS WITH AN AIR PERMEABILITY NOT GREATER THAN 0.004 CFM/FT2 (0.02 L/S · M2) UNDER A PRESSURE DIFFERENTIAL OF 0.3 INCH WATER GAUGE (75 PA) WHEN TESTED IN ACCORDANCE WITH ASTM E2178 SHALL COMPLY WITH THIS SECTION.

CONT. ……MATERIALS IN ITEMS 1 THROUGH 16 SHALL BE DEEMED TO COMPLY WITH THIS SECTION, PROVIDED JOINTS ARE SEALED AND MATERIALS ARE INSTALLED AS AIR BARRIERS IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

WHAT MATERIALS COMPLY?

C402.5.1.2.1 MATERIALS

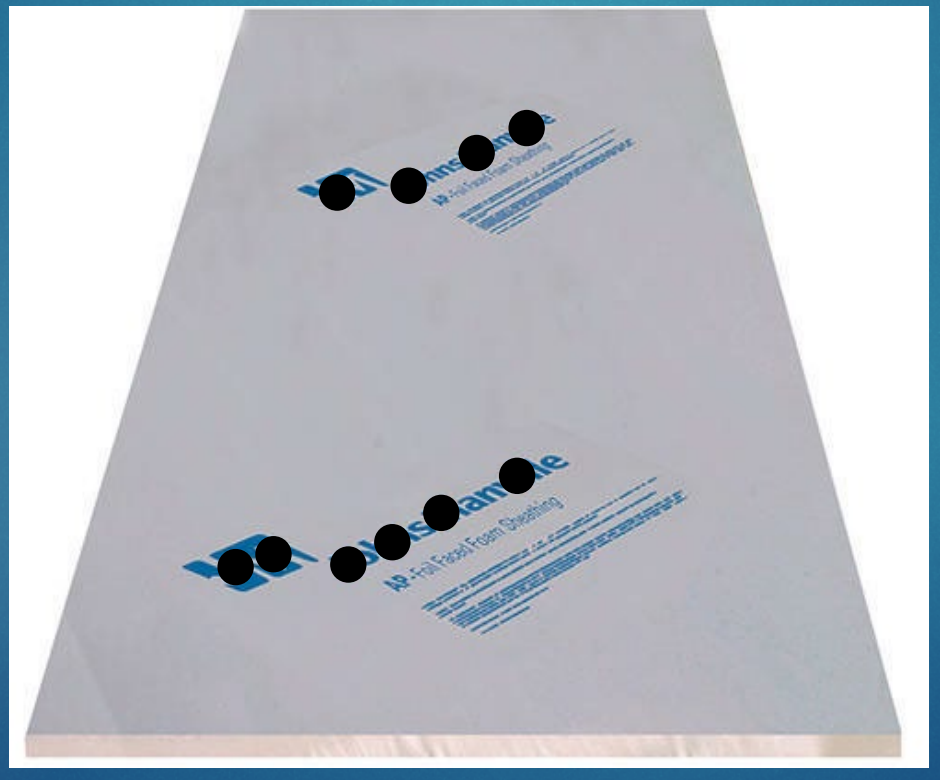
1) Plywood with a thickness of not less than 3/8 inch (10 mm).
2) Oriented strand board having a thickness of not less than 3/8 inch (10 mm).

WHAT MATERIALS COMPLY?

3) Extruded polystyrene insulation board having a thickness of not less than 1/2 inch (12.7 mm).

WHAT MATERIALS COMPLY?

4) Foil-back polyisocyanurate insulation board having a thickness of not less than 1/2 inch (12.7 mm).



WHAT MATERIALS COMPLY?

5) Closed-cell spray foam a minimum density of 1.5 pcf (2.4 kg/m3) having a thickness of not less than 11/2 inches (38 mm).
6) Open-cell spray foam with a density between 0.4 and 1.5 pcf (0.6 and 2.4 kg/m3) and having a thickness of not less than 4.5 inches (113 mm).

WHAT MATERIALS COMPLY?

Note:

In Florida, when Closed cell foam is applied to the underside of a roof deck, it has been known to cause typical asphalt shingles to retain the heat from the sun while not letting any heat pass through to the attic. Therefore the shingles rise in temperature much more than the manufacturer's specifications allow for and become weaker resulting in a shorter life span.

Check with Manufacturer of Shingles when using Closed Cell Spray foam

Sealing the Air Barrier

WHAT MATERIALS COMPLY?

Caution!

When using urethane foam insulation/ sealant, cover ProPEX EP fittings with a protective (PE, foil, etc.) wrap to prevent direct contact.

Sealing the Air Barrier

WHAT MATERIALS COMPLY?

7) Exterior or interior gypsum board having a thickness of not less than 1/2 inch (12.7 mm).
8) Cement board having a thickness of not less than ½ inch
9) Built-up roofing membrane.
10) Modified bituminous roof membrane.
11) Fully adhered single-ply roof membrane.
12) A Portland cement/sand parge, or gypsum plaster having a thickness of not less than 5/8 inch (15.9 mm).

Sealing the Air Barrier

WHAT MATERIALS COMPLY?

13. Cast-in-place and precast concrete.
14. Fully grouted concrete block masonry.
15. Sheet steel or aluminum.
16. Solid or hollow masonry constructed of clay or shale masonry units.

Sealing the Air Barrier

How it is installed makes all the difference

C303.2 INSTALLATION. MATERIALS, SYSTEMS AND EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND THE FLORIDA BUILDING CODE, BUILDING.

Sealing the Air Barrier

WHAT ABOUT THE WALLS AND SPACE ABOVE THE CEILING?

C402.5.9.1 Vented Dropped Ceiling Cavities.

Where **vented** dropped ceiling cavities occur over conditioned spaces, **the ceiling** shall be considered to be both the upper thermal envelope and pressure envelope of the building and **shall contain a continuous air barrier** between the conditioned space and the vented unconditioned space that is also sealed to the air barrier of the walls. See the definition of air barrier in Section C202.

Sealing the Air Barrier

SEALED DRYWALL IS AN EFFECTIVE AIR BARRIER

Sealing the Air Barrier

C402.5.9.2 Unvented Dropped Ceiling Cavities. Cont.

Where **unvented** dropped ceiling cavities occur over conditioned spaces that do not have an air barrier between the conditioned and unconditioned space (such as T-bar ceilings), they **shall be completely sealed from the exterior environment (at the roof plane) and adjacent spaces by a continuous air barrier that is also sealed to the air barrier of the walls.** In that case, **the roof assembly** shall constitute both the upper thermal envelope and pressure envelope of the building.

Sealing the Air Barrier

IF USING AN ACOUSTICAL T-BAR TYPE CEILING FOR AN OFFICE SPACE, THE CAVITY ABOVE MUST BE SEALED TO THE OUTSIDE OF THE BUILDING WITH AN AIR BARRIER AND ALSO UNCONDITIONED VENTILATED SPACES LIKE WAREHOUSES.

Sealing the Air Barrier

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.

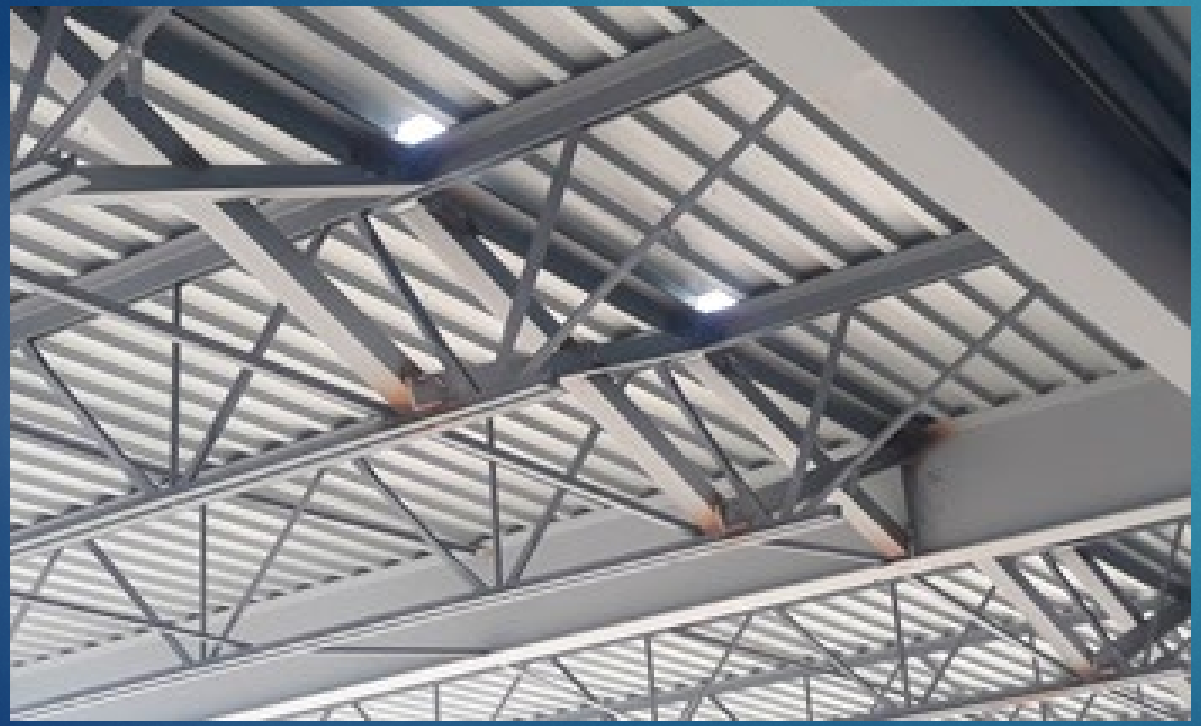
Sealing the Air Barrier

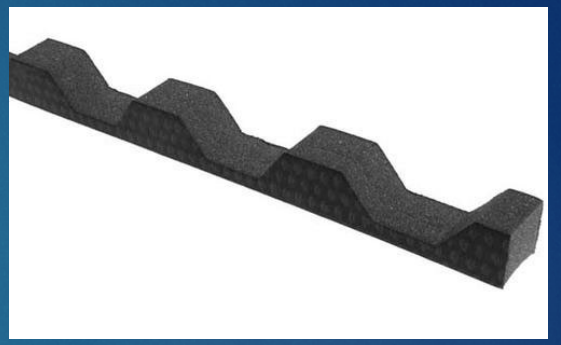
C402.5.1.1 Air Barrier Construction.

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 pressure from wind, stack effect and mechanical ventilation.

Sealing the Air Barrier

Corrugated Decking can be a Challenge to Seal





Openings Into the Building

C402.5.1.1 Air Barrier Construction

3) Penetrations of the air barrier shall be caulked, gasketed or otherwise sealed in a manner compatible with the construction materials and location. Joints and seals associated with penetrations shall be sealed in the same manner or taped or covered with moisture vapor-permeable wrapping material. Sealing materials shall be appropriate to the construction materials being sealed and shall be securely installed around the penetration so as not to dislodge, loosen or otherwise impair the penetrations' ability to resist positive and negative pressure from wind, stack effect and mechanical ventilation.

Openings Into the Building

3) Cont....

Sealing of concealed fire sprinklers, where required, shall be in a manner that is recommended by the manufacturer. Caulking or other adhesive sealants shall not be used to fill voids between fire sprinkler cover plates and walls or ceilings.

Openings Into the Building

4) Recessed lighting fixtures shall comply with Section C402.5.8. Where similar objects are installed that penetrate the air barrier, provisions shall be made to maintain the integrity of the air barrier.

Openings Into the Building

C402.5.8 Recessed Lighting
Recessed luminaires installed in the building thermal envelope shall be all of the following.

1) IC-rated

2) Labeled as having an air leakage rate of not more 2.0 cfm (0.944 L/s) when tested in accordance with ASTM E283 at a 1.57 psf (75 Pa) pressure differential

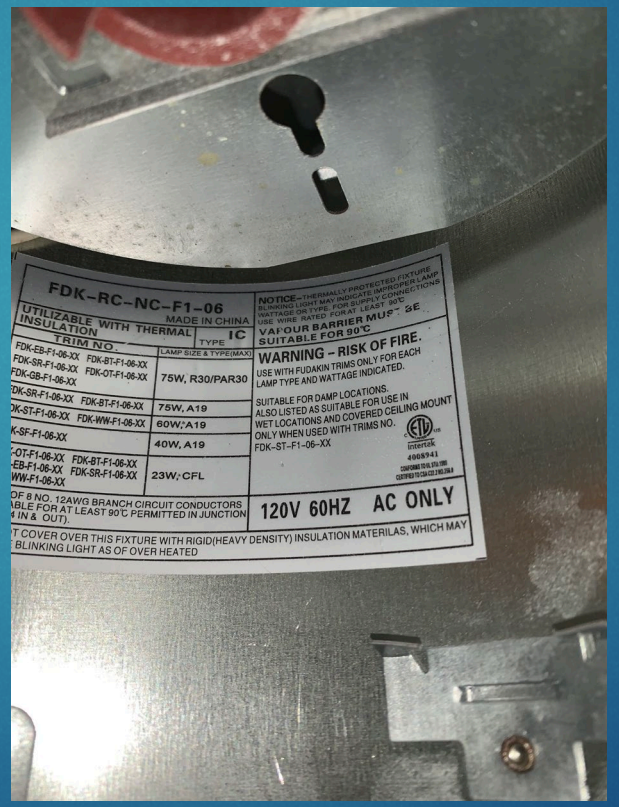
3) Sealed with a gasket or caulk between the housing and interior wall or ceiling covering

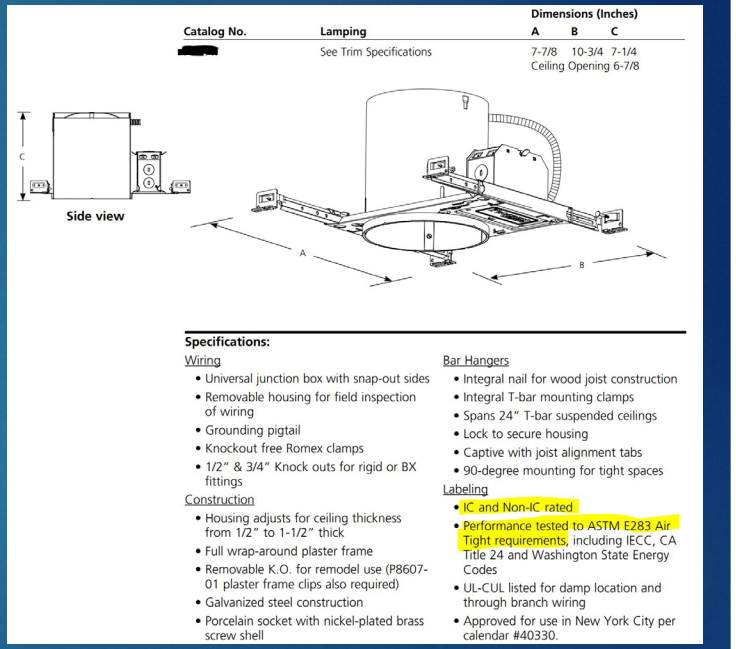
Openings Into the Building

CHECK THE LISTING OF THE PRODUCT AND MAKE SURE IT IS

IC RATED (INSULATION CONTACT)

PERFORMANCE TESTED FOR LEAKAGE





Catalog No.	Lamping	Dimensions (Inches) A	B	C
[redacted]	See Trim Specifications	7-7/8	10-3/4	7-1/4
		Ceiling Opening 6-7/8		

Side view

Specifications:

Wiring
- Universal junction box with snap-out sides
- Removable housing for field inspection of wiring
- Grounding pigtail
- Knockout free Romex clamps
- 1/2" & 3/4" Knock outs for rigid or BX fittings

Construction
- Housing adjusts for ceiling thickness from 1/2" to 1-1/2" thick
- Full wrap-around plaster frame
- Removable K.O. for remodel use (P8607-01 plaster frame clips also required)
- Galvanized steel construction
- Porcelain socket with nickel-plated brass screw shell

Bar Hangers
- Integral nail for wood joist construction
- Integral T-bar mounting clamps
- Spans 24" T-bar suspended ceilings
- Lock to secure housing
- Captive with joist alignment tabs
- 90-degree mounting for tight spaces

Labeling
- IC and Non-IC rated
- Performance tested to ASTM E283 Air Tight requirements, including IECC, CA Title 24 and Washington State Energy Codes
- UL-CUL listed for damp location and through branch wiring
- Approved for use in New York City per calendar #40330.

Openings Into the Building

C103.2 Information on construction documents.

Air Sealing Details

Openings Into the Building

Open or Closed-cell Spray Foam with a minimum density of 1.5 pcf

Openings Into the Building

C202 DEFINITIONS:

Air Barrier-For mechanical closets, the air barrier may be a uniform panelized material such as gypsum wallboard that meets ASTM C36, or it may be a membrane that alone acts as an air barrier that is attached to a panel, such as the foil cladding of fibrous glass duct board.

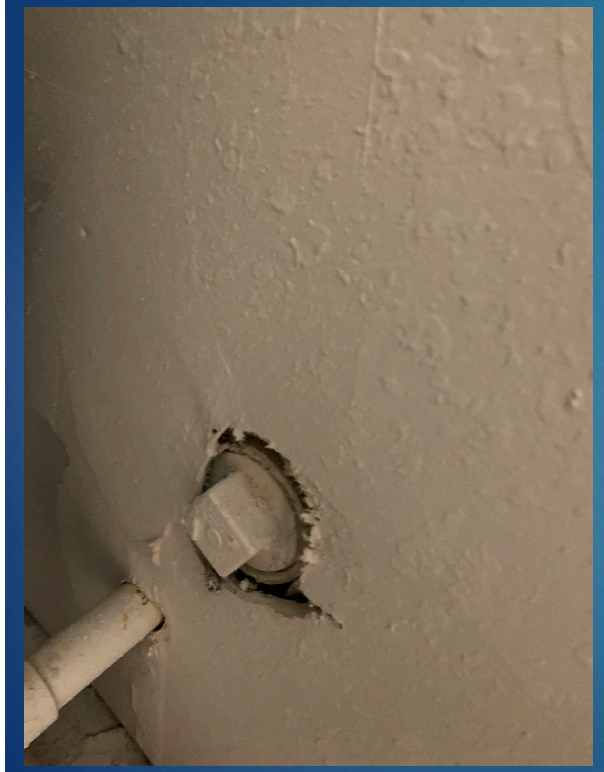
MECHANICAL CLOSET:
For the purposes of this code, a closet used as an air plenum that contains the blower unit or air handler of a central air conditioning or heating unit.

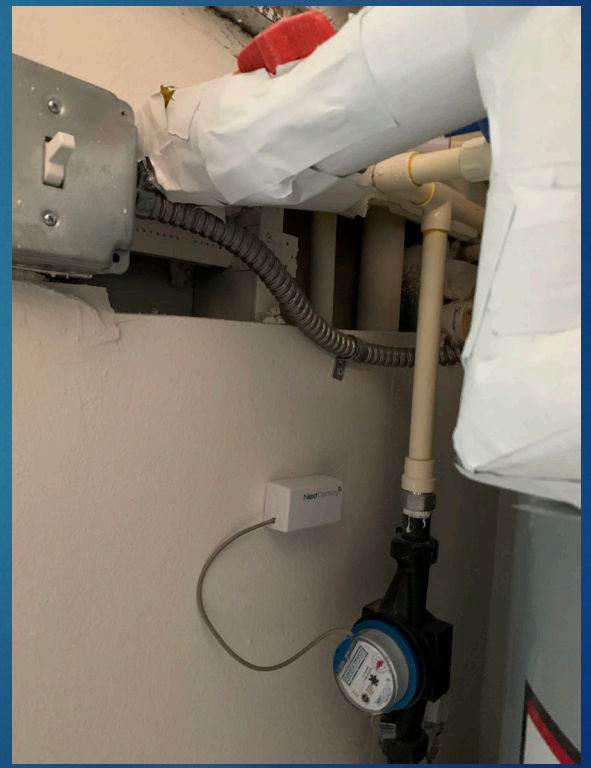
Openings Into the Building

Mechanical Closets
Table C403.2.9.2
All joints between the air barriers of walls, ceiling, floor and door framing and all penetrations of the air barrier shall be sealed to the air barrier with approved closure systems.
Through-wall, through-floor and through ceiling air passageways into the closet shall be framed and sealed to form an air-tight passageway.
Exception:
Air passageways into the closet from conditioned space that are specifically designed for return airflow.

Openings Into the Building

Penetrations in Mechanical Closet must be Sealed





Openings Into the Building

Table C403.2.9.2
The following air barriers are approved for use in mechanical closets:
1. One-half-inch-thick (12.7 mm) or greater gypsum wallboard, taped and sealed with joint compound over taped joints between gypsum wallboard panels.

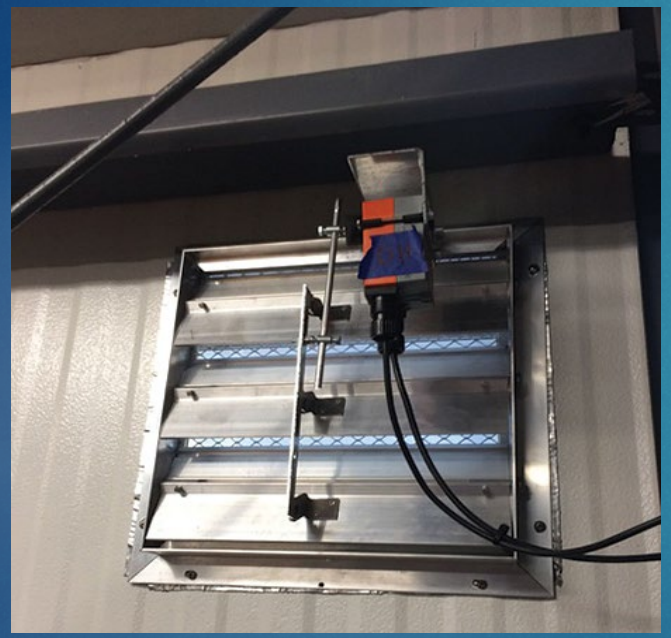
2. Other panelized materials having inward facing surfaces with an air porosity no greater than that of a duct product meeting Section 22 of UL 181, which are sealed on all interior surfaces to create a continuous air barrier by one of the following:
a. Sealants complying with the product and application standards of this table for fibrous glass duct-board or
b. A suitable long-life caulk or mastic for all applications.

Openings Into the Building

C402.5.5 Air Intakes, Exhaust openings, stairways, and shafts

Stairway enclosure's, elevator shaft vents, and other outdoor air intakes and exhaust openings integral to the building envelope shall be provided with dampers in accordance with Section C403.2.4.3

Openings Into the Building



Openings Into the Building

C403.2.4.3 Shutoff Dampers

1) Outdoor air intake and exhaust openings shall be “Class 1”, and shall not have a leakage rate greater that 4cfm.per Sq. Ft. The Damper shall be tested according to AMCA 500 D for leakage.

2) Controls shall shut the damper when space is unoccupied or during warm-up.

Openings Into the Building

EXCEPTION: (ANY ONE OF THE THREE)

GRAVITY DAMPERS (NON-MOTORIZED) SHALL BE PERMITTED TO BE USED:

- BUILDINGS LESS THAN THREE STORIES
- BUILDINGS IN CLIMATE ZONE 1, 2, OR 3
- WHERE DESIGN IS NOT GREATER THAN 300 CFM

Openings Into the Building

Gravity Dampers

Gravity Dampers

Openings Into the Building

Verify Testing by looking for Label

Openings Into the Building

WINDOWS AND DOORS ARE REQUIRED TO BE TESTED FOR LEAKAGE

TABLE C402.5.2
MAXIMUM AIR LEAKAGE RATE FOR FENESTRATION ASSEMBLIES

FENESTRATION ASSEMBLY	MAXIMUM RATE (CFM/FT^2)	TEST PROCEDURE
Windows	0.20 [a]	AAMA/WDMA/ CSA101/I.S.2/A440 or NFRC 400
Sliding doors	0.20 [a]	
Swinging doors	0.20 [a]	
Skylights – with condensation weepage openings	0.30	
Skylights – all other	0.20 [a]	
Curtain walls	0.06	NFRC 400 or ASTM E283 at 1.57 psf (75 Pa)
Storefront glazing	0.06	
Power-operated sliding doors and power-operated folding doors, Commercial glazed swinging entrance doors	1.00	
Revolving doors	1.00	
Garage doors	0.40	ANSI/DASMA 105, NFRC 400, or ASTM E283 at 1.57 psf (75 Pa)
Rolling doors	1.00	
High-speed doors	1.30	

For SI: 1 cubic foot per minute = 0.47 L/s, 1 square foot = 0.093 m^2.

a. The maximum rate for windows, sliding and swinging doors, and skylights is permitted to be 0.3 cfm per square foot of fenestration or door area when tested in accordance with AAMA/WDMA/CSA101/I.S.2/A440 at 6.24 psf (300 Pa).

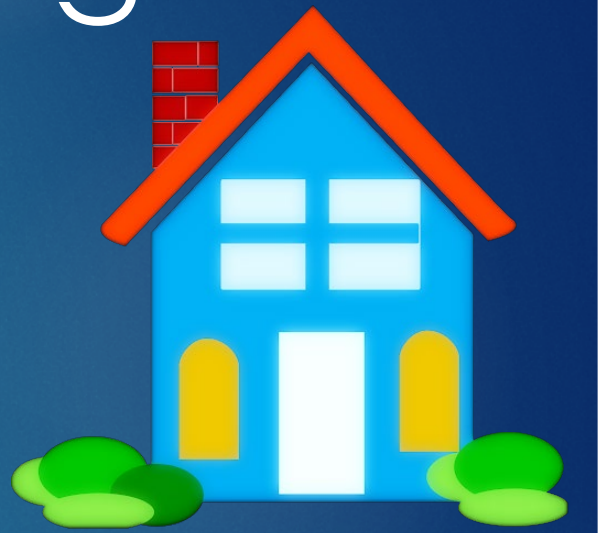
Openings Into the Building

C402.5.4

DOORS AND ACCESS SPACES FROM CONDITIONED SPACES……SHALL BE GASKETED, WEATHER-STRIPPED, OR SEALED

Openings Into the Building

Exterior and Garage Doors are to be sealed



Openings Into the Building

WHEN A WAREHOUSE IS AIR CONDITIONED FOR HUMAN COMFORT

C402.5.6 LOADING DOCK WEATHERSEALS

LOADING DOCK DOOR OPENINGS SHALL BE EQUIPPED WITH WEATHER SEALS THAT RESTRICT INFILTRATION

Openings Into the Building

Seal Kit

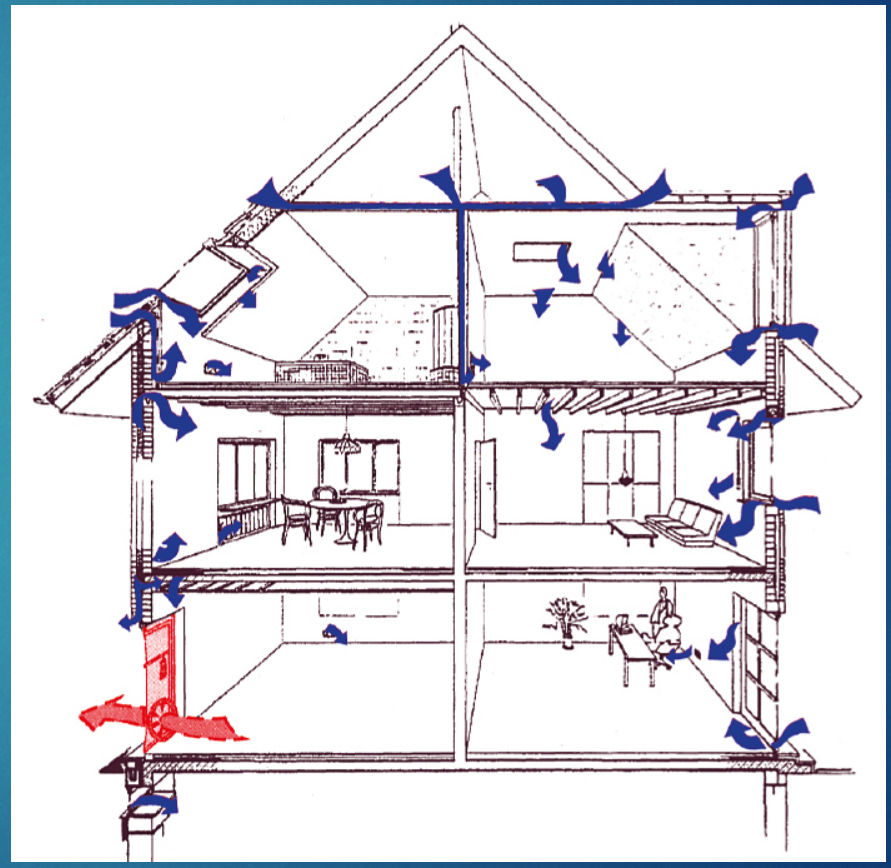
Warehouse Door

Testing

WHY TEST?

Testing

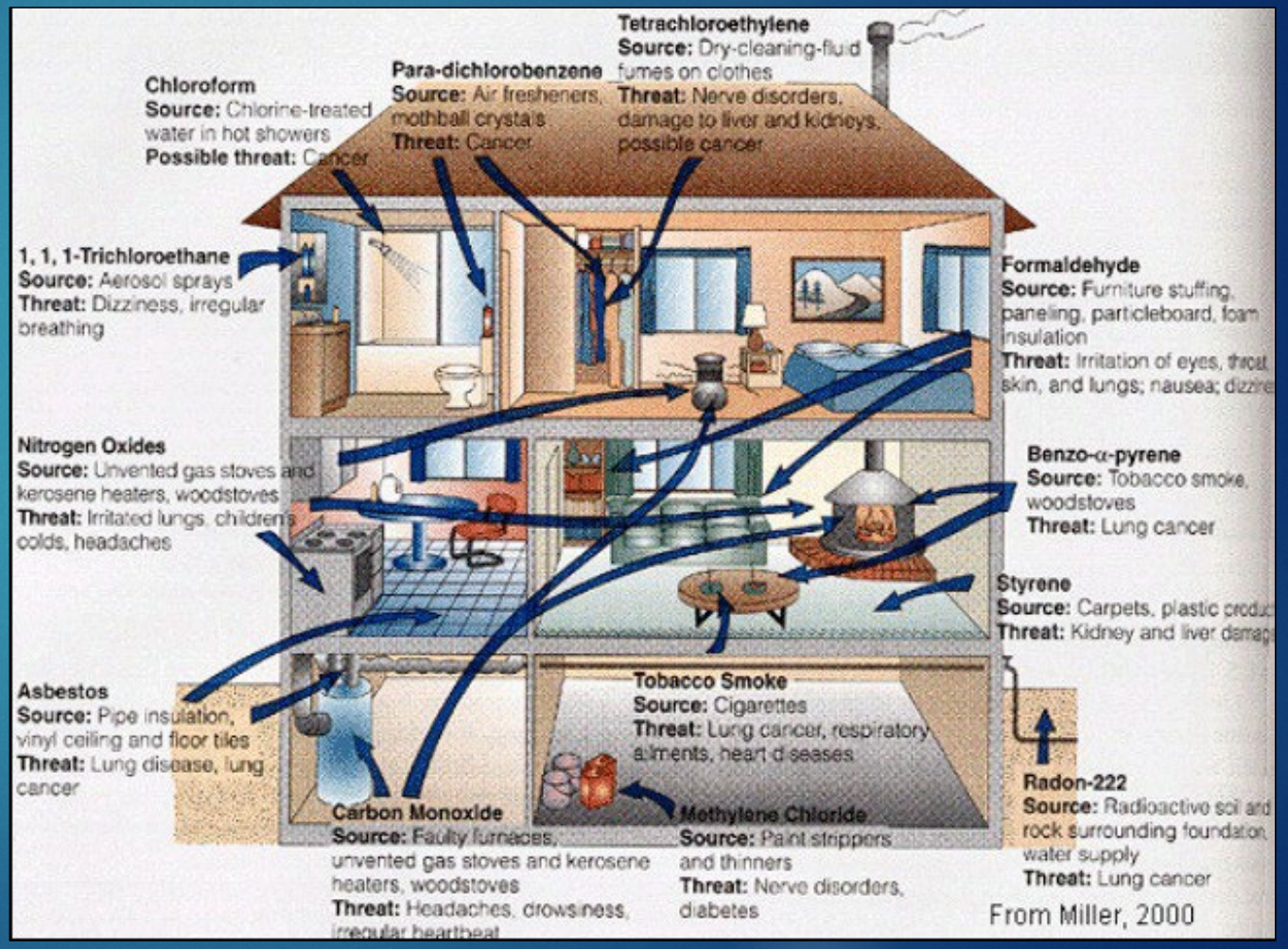
UNCONTROLLED INFILTRATION INCREASES COOLING COSTS AND INCREASES THE MOISTURE IN THE INTERIOR ENVIRONMENT



Testing

In the last several years, a growing body of scientific evidence has indicated that the air within homes and other buildings can be more seriously polluted than the outdoor air in even the largest and most industrialized cities.

http://www.epa.gov/iaq/pubs/insidest.html



Testing

Residential Energy Code

MANDATORY PROVISION

R402.4.1.2 Testing. The building or dwelling unit shall be tested and verified as having an air leakage rate not exceeding (7) seven air changes per hour in Climate Zone 1

Testing

COMMERCIAL ENERGY CODE

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. (ELEVATOR VENTS, CARGO DOORS)

Testing

Positive Air Pressure

Air pressure inside is greater than pressure outside.

Air gets pushed into walls and insulation.

Negative Air Pressure

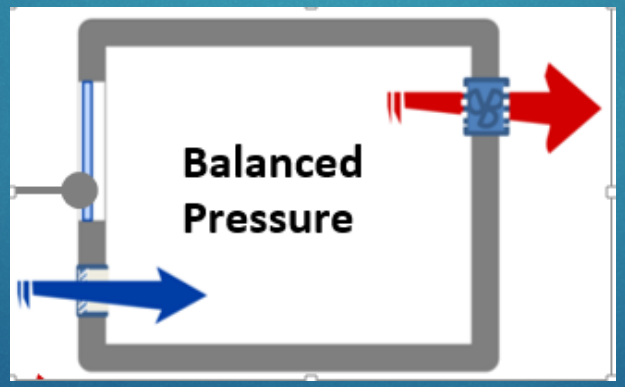
Air pressure inside is lower than pressure outside.

Outside air rushes in to try and balance the pressure difference.

Testing

THE VENTILATION BALANCE FOR A COMMERCIAL BUILDINGS SHOULD BE SHOWN ON THE PLANS FOR RESTURANTS

C408.2.2.1 Air systems balancing …….
Building envelope pressurization should be either neutral or positive to prevent infiltration of excess latent load.



Common Leaks in Buildings

1) RECESSED LIGHTING

2) SEAL PLATES

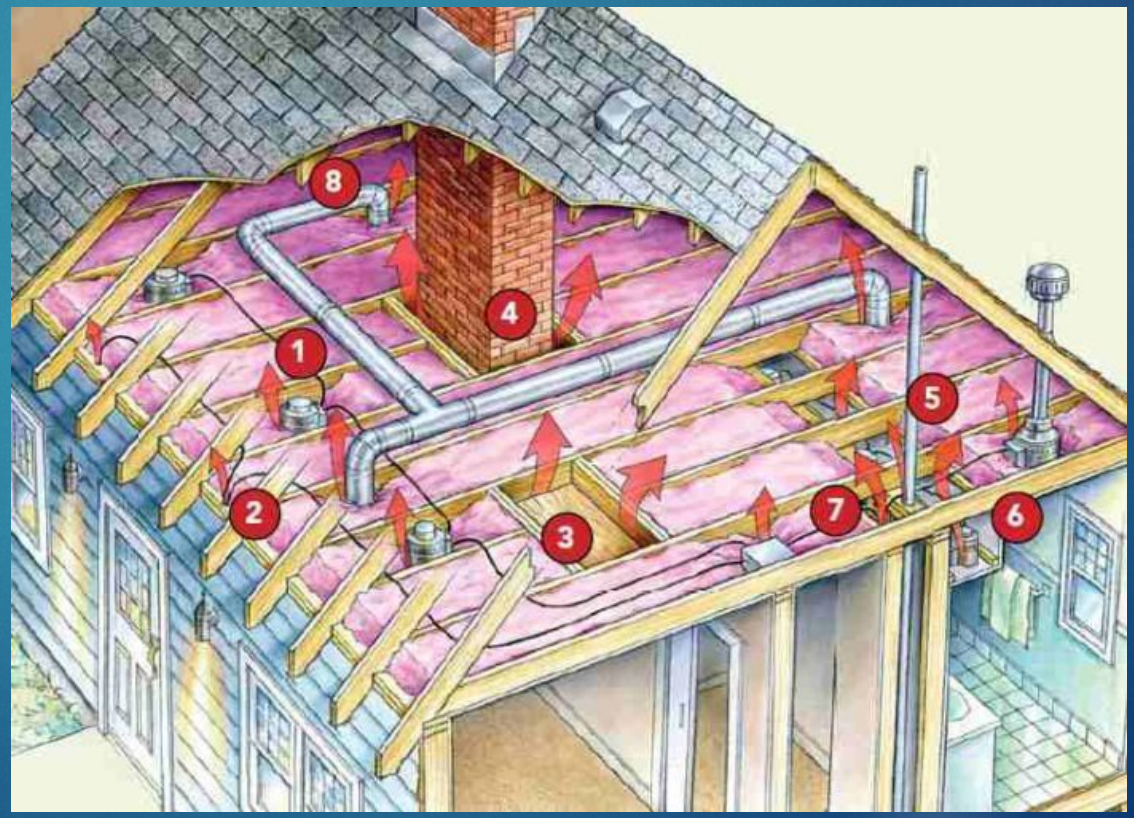
3) ATTIC HATCHES

4) CHIMNEYS/VENTS

5) EXHAUST FANS

6) A/C GRILLS

Where are the Leaks?



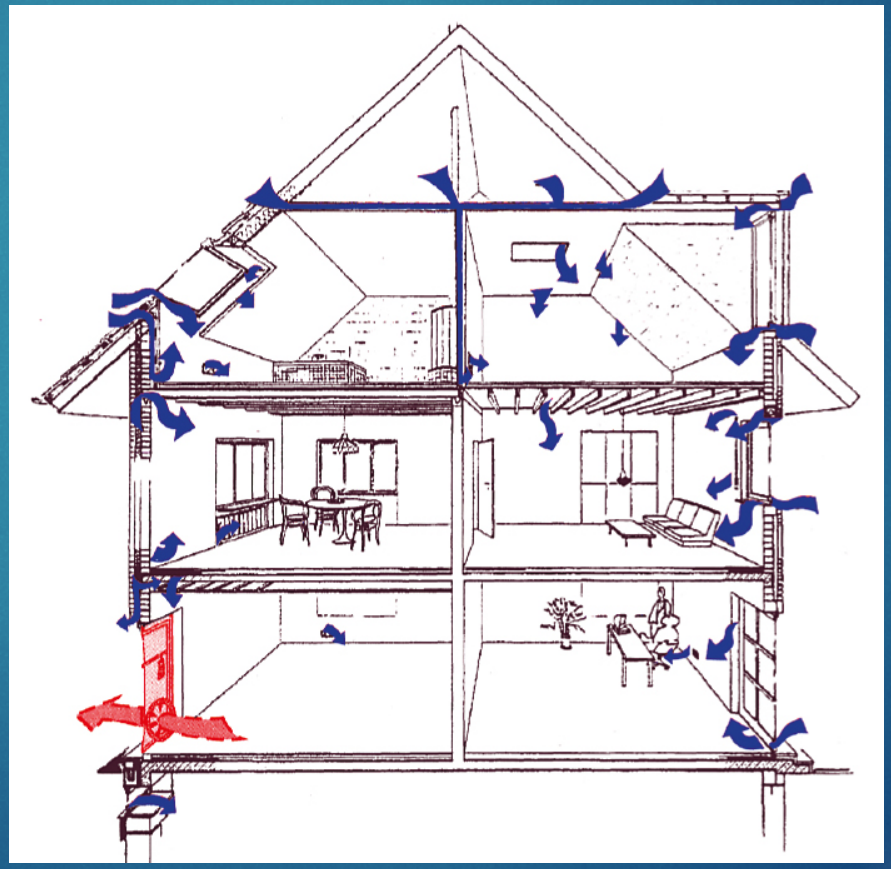
Testing

CAN A BUILDING BE TOO TIGHT?

YES, IF NO MECHANICAL VENTILATION IS PROVIDED

Testing

TOO TIGHT A BUILDING TRAPS CONTAMINANTS INSIDE BUILDING IF NO VENTILATION IS PROVIDED



Testing

TOO TIGHT A BUILDING TRAPS CONTAMINANTS INSIDE BUILDING IF NO VENTILATION IS PROVIDED

Known Health Effects of Indoor Pollutants:

- Asthma
- Allergies
- Cancer
- Compromised immune systems
- Developmental defects and delays, including vision, hearing, growth, intelligence and learning
- Eye, nose and throat irritation
- Fatigue
- Headaches
- Heart and Lung conditions
- Kidney and Liver effects
- Mutagenicity
- Reproductive issues
- Respiratory effects

EPA, Healthy Buildings, Healthy People: a Vision for the 21st Century. October 2001
EPA, Report to Congress on Indoor Air Quality, Volume II: Assessment and Control of Indoor Air Pollution, August 1989, EPA/400/1-89/001C

Testing

Residential Energy Code

R403.6 Mechanical Ventilation (Mandatory). The building shall be provided with ventilation that meets the requirements of the *Florida Building Code, Residential,* or *Florida Building Code, Mechanical*, as applicable, or with other approved means of ventilation including:
Natural, Infiltration or Mechanical means. Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating.

Testing

Residential Building Code

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.

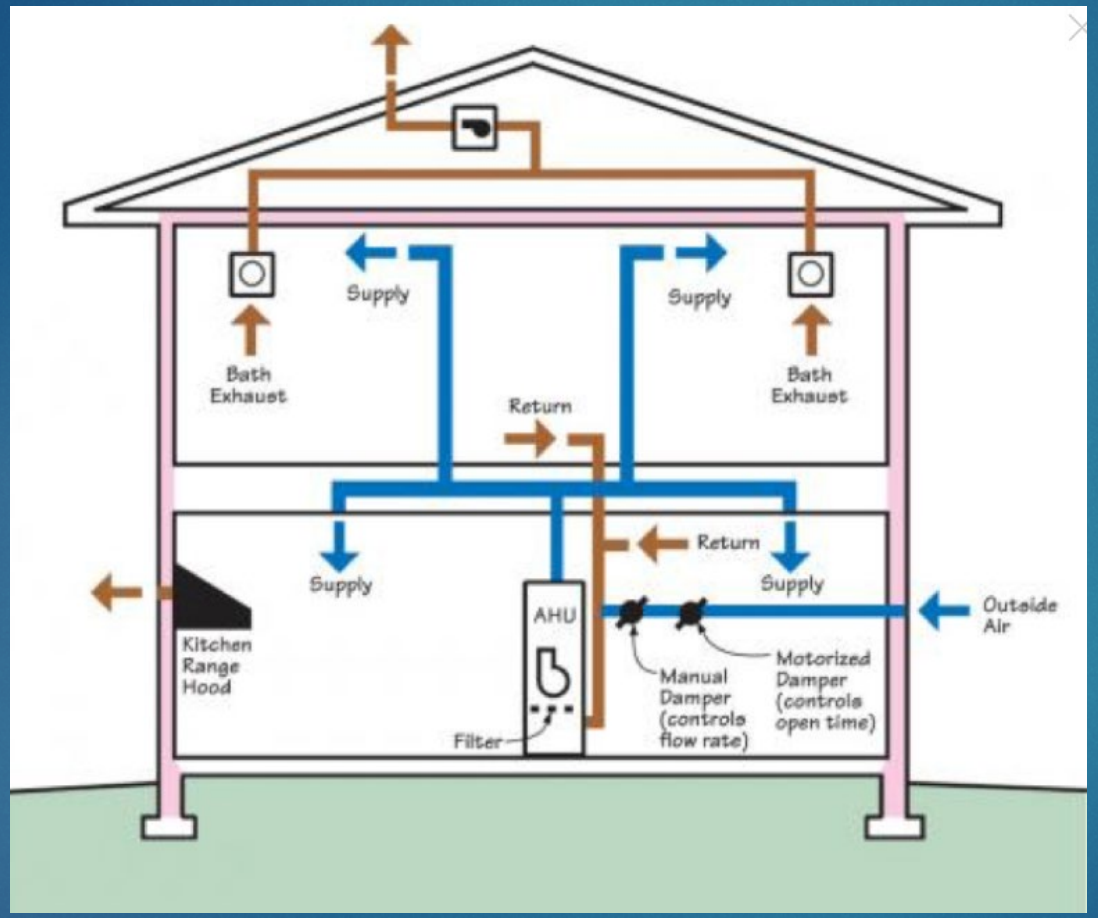
M1507.3 Whole-house mechanical ventilation system.
Whole-house mechanical ventilation systems shall be designed in accordance with Sections M1507.3.1 through M1507.3.3.

Ventilation Methods

Residential Building Code

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. Local exhaust or supply fans are permitted to serve as such a system. Outdoor air ducts connected to the return side of an air handler shall be considered as providing supply ventilation.

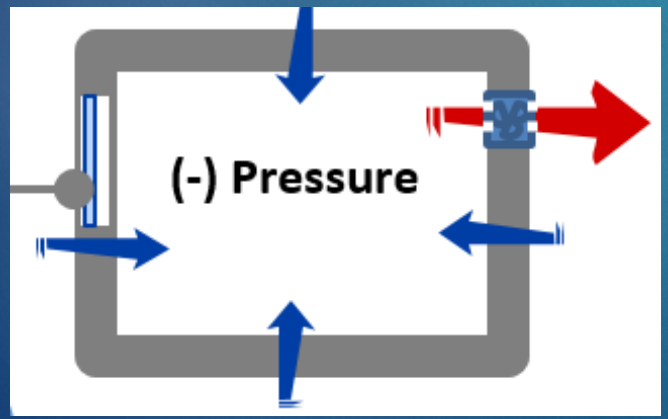
Ventilation Methods



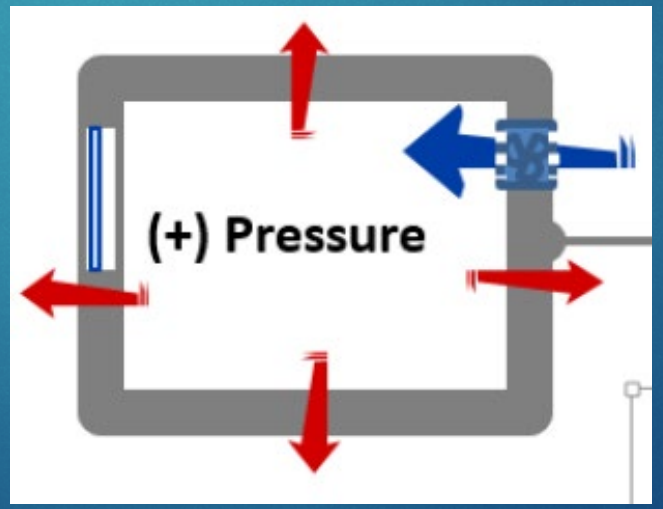
Ventilation Methods

Exhaust Fans Must Meet Efficacy Requirements

Exhaust Only



Supply Only



Ventilation Methods

TABLE R403.6.1
WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM FAN EFFICACY

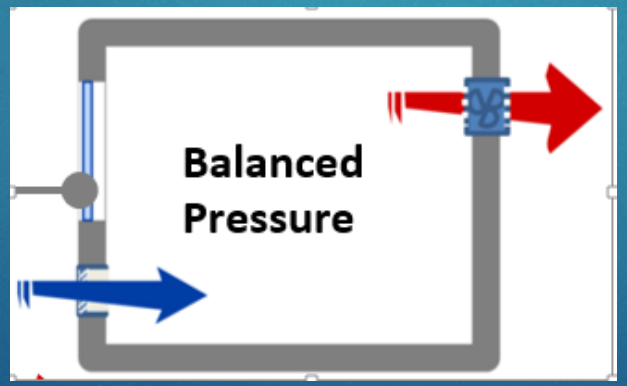
FAN LOCATION	AIRFLOW RATE MINIMUM (CFM)	MINIMUM EFFICACY[a] (CFM/WATT)	AIRFLOW RATE MAXIMUM (CFM)
HRV or ERV	Any	1.2 cfm/watt	Any
Range hoods	Any	2.8 cfm/watt	Any
In-line fan	Any	2.8 cfm/watt	Any
Bathroom, utility room	10	1.4 cfm/watt	< 90
Bathroom, utility room	90	2.8 cfm/watt	Any

For SI: 1 cfm = 28.3 L/min.

a. When tested in accordance with HVI Standard 916.

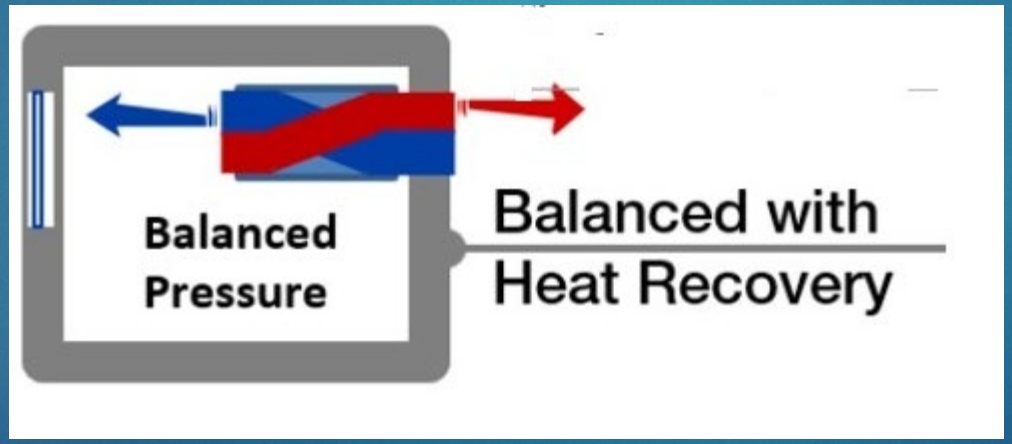
Ventilation Methods

Balanced Systems Consist of Supply and Exhaust Fans Which Provide Equal Amounts of Outdoor Air And Exhaust Air



Ventilation Methods

Balanced Systems Sometimes Use an Energy Recovery Ventilation System to Minimize the Added Humidity Associated with Outdoor Air



Ventilation Methods

How Much Ventilation Do We Need?

M1507.3.3 Says Use Table M1507.3.3(1) OR

Use Formula "CFM = (0.01 × Sq./Ft. Home) + [7.5 ×(#Bedrooms + 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.

Ventilation Methods

Example:

- **1700 ft2 home with 3 bedrooms**
- **Per Table 1507.3.3(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.

Ventilation Methods

Example:

- **1700 ft2 home with 3 bedrooms**

CALCULATED:

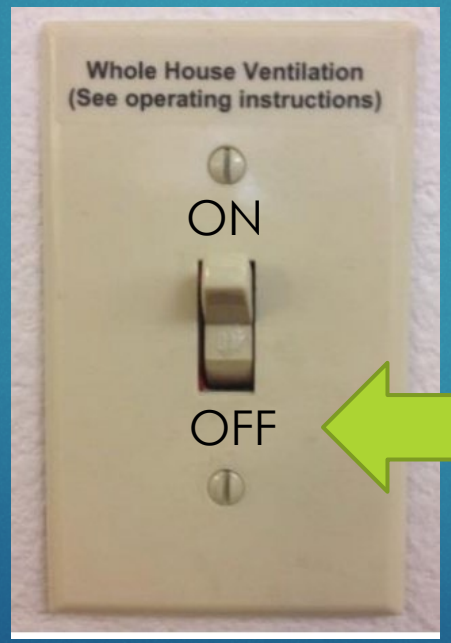
CFM = (0.01 × Sq./Ft. Home) + [7.5 ×(#Bedrooms + 1)]”

(0.01 × 1700) + [7.5 ×(3+ 1)] or 17+30 = 47cfm

Ventilation Methods

WHAT ABOUT CONTROLS?

M1507.3.2 System controls. The whole-house mechanical ventilation system shall be provided with controls that enable manual override. Controls shall include text or a symbol indicating their function.



Ability to Turn Off

Ventilation Methods

WHAT ABOUT CONTROLS?

M1507.3.2 System controls. The whole-house mechanical ventilation system shall be provided with controls that enable manual override. Controls shall include text or a symbol indicating their function.

THANK YOU!

QUESTIONS?