



North
Branch
Services

Top 10 Things You Need To Know.... Energy Code & ECCCNY-2020 Updates

r.

Monroe County Fire Marshalls and Inspectors Conference

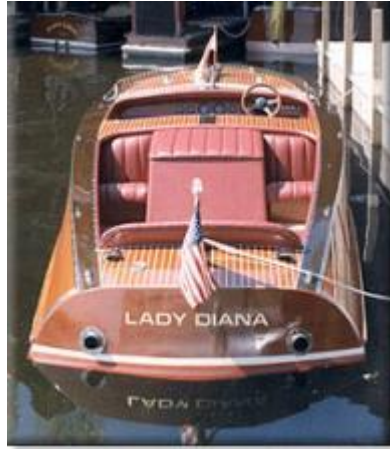
W. Webster, NY

T02-07-2841

August 2021

Where I Come From...





NEW
ENERGY
STORE

USGBC – IAQ
Cmte.
ICC – SEHPCAC
ASHRAE 189
IGCC



But First - Thank You For Your Service...



Before We Start...

Is the Energy Code a Life Health Safety Code?

Yes...

No...

Maybe...

Anybody Identify This Horrific Fire?



Do We Think This Will Result in Structural Durability Problems?!





Water Damage Assessment



Do We Think This Might Result in Structural Failure?!



And This?!



And This?!



Check Your Knowledge... #1

True or False

Requirements of the Energy Code can address and mitigate numerous life/health safety issues, if enforced and complied with properly

Check Your Knowledge... #1

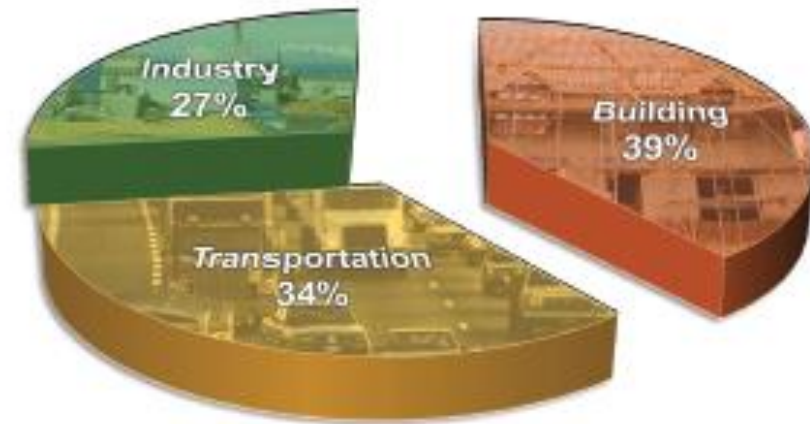
True or False

Requirements of the Energy Code can address and mitigate numerous life/health safety issues, if enforced and complied with Properly

Answer - TRUE

Building Energy Use

- ▶ U.S. buildings use 40% of total
- ▶ Consume 70% of electricity
- ▶ Responsible for 8% of global CO2
- ▶ Decades long building life-cycle
- ▶ Energy codes curb growing impact of building energy use

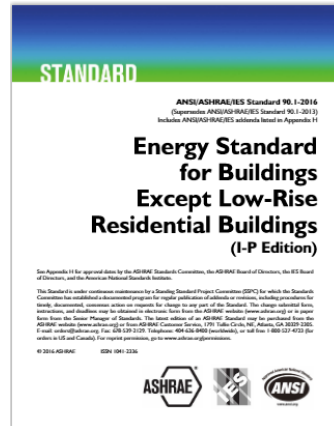


What the Energy Code Covers

- ▶ Building Envelope
- ▶ HVAC
- ▶ Lighting
- ▶ Service Water Heating



2018 IECC



ASHRAE 90.1-2016

ECCNYS-2020

#1 - All New Homes Must Be Air Leakage Tested

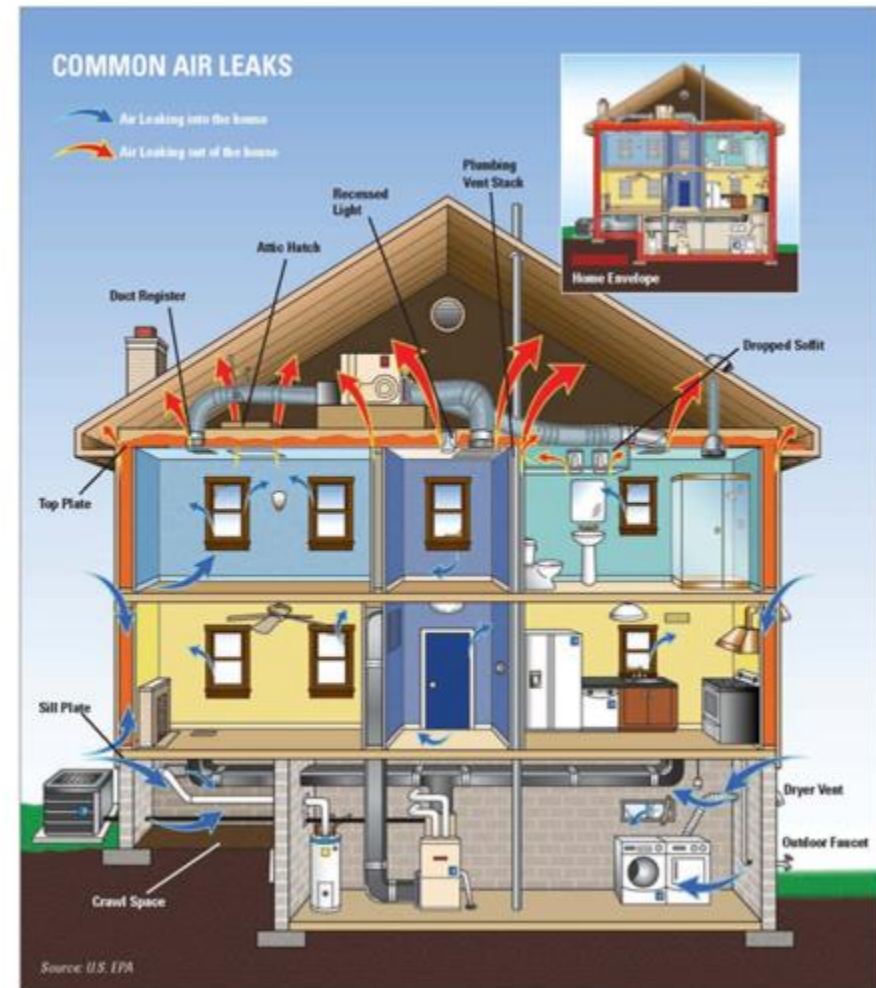
- ▶ Section 402.4
- ▶ Performance testing of house leakage
 - ▶ Blower door result must be less than 3 ACH50
 - ▶ For Multifamily - .3CFM50/ft² of Envelope
 - ▶ MF > 7 Dwelling units - SAMPLE unit may be tested (see ground rules)
- ▶ Additions, Substantial Renovations NOT included in that requirement
- ▶ Tenant Separation Walls MUST BE Insulated to R-10 and Air Sealed



1 - Mandatory Testing

Air Leakage MUCH More Important now

- ▶ Seal all joints, penetrations and other such openings in the building envelope
- ▶ **MUST TEST ALL HOMES!!**
- ▶ **Whole-House Mechanical Ventilation Required**
- ▶ **ASSURE Makeup Air Provided!**



Why - Better Durability



Why - Fewer Callbacks



Check Your Knowledge... #2

True or False

Enforcing of and compliance with the Air Sealing and Insulation requirements of the NY Energy Code can reduce or eliminate Ice Damming.

Check Your Knowledge... #2

True or False

Enforcing of and compliance with the Air Sealing and Insulation requirements of the NY Energy Code can reduce or eliminate Ice Damming.

Answer - TRUE

Air-Sealing Techniques

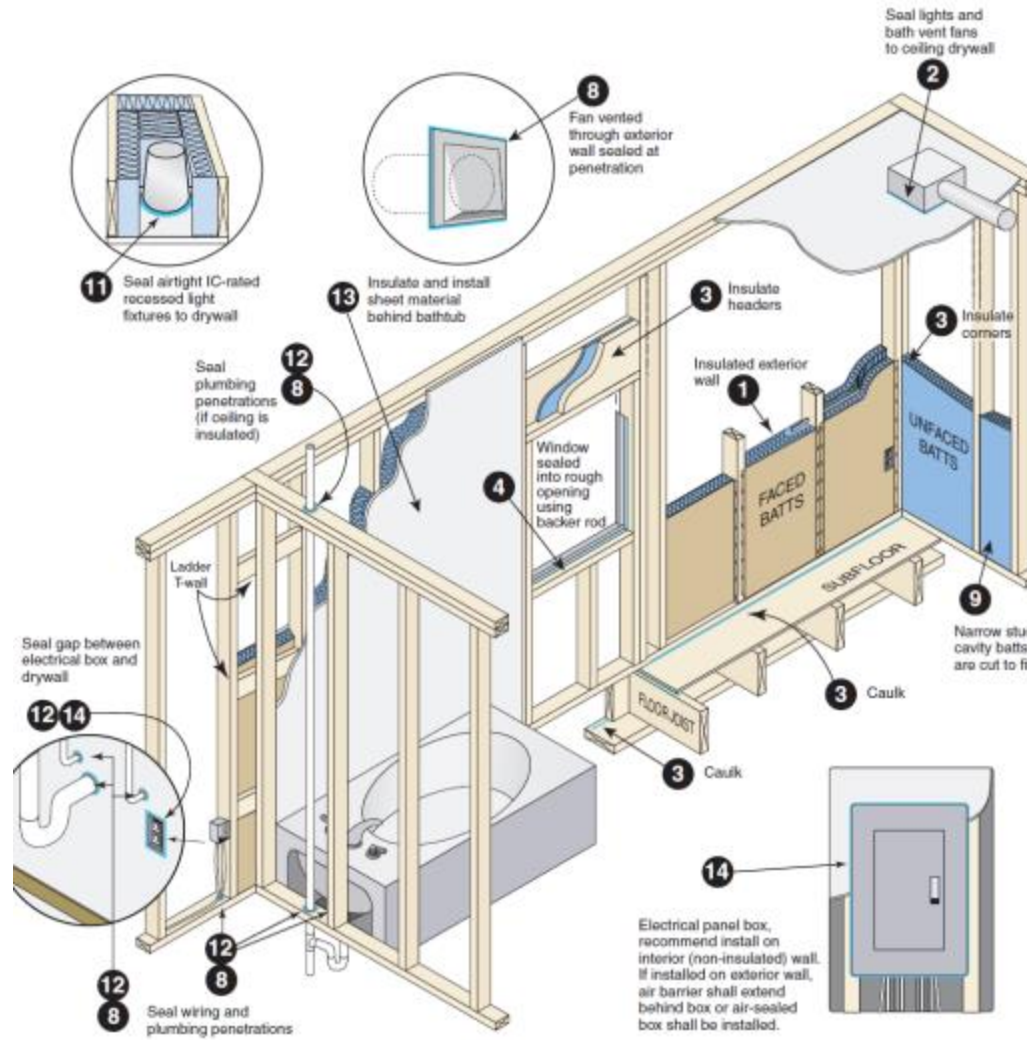


TABLE 14032.4.1.1
AIR BARRIER AND INSULATION INSTALLATION*

#2 - Visual Inspection Too

COMPONENT	AIR BARRIER CRITERIA	INSULATION INSTALLATION CRITERIA
General requirements	A continuous air barrier shall be installed in the building envelope. The exterior thermal envelope contains a continuous air barrier. Breaks or joints in the air barrier shall be sealed.	Air-permeable insulation shall not be used as a sealing material.
Ceiling/attic	The air barrier in any dropped ceiling or soffit shall be aligned with the insulation and any gaps in the air barrier shall be sealed. Access openings, drop down stairs or knee wall doors to unconditioned attic spaces shall be sealed.	The insulation in any dropped ceiling/soffit shall be aligned with the air barrier.
Walls	The junction of the foundation and sill plate shall be sealed. The junction of the top plate and the top of exterior walls shall be sealed. Knee walls shall be sealed.	Cavities within corners and headers of frame walls shall be insulated by completely filling the cavity with a material having a thermal resistance, R-value, of not less than R-3 per inch. Exterior thermal envelope insulation for framed walls shall be installed in substantial contact and continuous alignment with the air barrier.
Windows, skylights and doors	The space between framing and skylights, and the joints of windows and doors, shall be sealed.	—
Rim joints	Rim joints shall include the air barrier.	Rim joints shall be insulated.
Floors, including cantilevered floors and floors above garages	The air barrier shall be installed at any exposed edge of insulation.	Floor framing cavity insulation shall be installed to maintain permanent contact with the underside of subfloor decking. Alternatively, floor framing cavity insulation shall be in contact with the top side of sheathing, or continuous insulation installed on the underside of floor framing, and shall extend from the bottom to the top of all perimeter floor framing members.
Crawl space walls	Exposed earth in unvented crawl spaces shall be covered with a Class I vapor retarder with overlapping joints taped.	Crawl space insulation, when provided instead of floor insulation, shall be permanently attached to the walls.
Shafts, penetrations	Duct shafts, utility penetrations, and flue shafts opening to exterior or unconditioned space shall be sealed.	—
Narrow cavities	—	Batts to be installed in narrow cavities shall be cut to fit or narrow cavities shall be filled with insulation that on installation readily conforms to the available cavity space.
Garage separation	Air sealing shall be provided between the garage and conditioned spaces.	—
Recessed lighting	Recessed light fixtures installed in the building thermal envelope shall be sealed to the finished surface.	Recessed light fixtures installed in the building thermal envelope shall be air tight and IC rated.
Plumbing and wiring	—	In exterior walls, batt insulation shall be cut neatly to fit around wiring and plumbing, or insulation, that on installation readily conforms to available space, shall extend behind piping and wiring.
Showers/tubs on exterior wall	The air barrier installed at exterior walls adjacent to showers and tubs shall separate the wall from the shower or tub.	Exterior walls adjacent to showers and tubs shall be insulated.
Electrical/phone box on exterior walls	The air barrier shall be installed behind electrical and communication boxes. Alternatively, air-sealed boxes shall be installed.	—
HVAC register boots	HVAC supply and return register boots that penetrate building thermal envelope shall be sealed to the subfloor, wall covering or ceiling penetrated by the boot.	—
Concealed sprinklers	Where required to be sealed, concealed fire sprinklers shall only be sealed 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.	—

* Installation of low walls shall be in accordance with the provisions of ICC-703.

Visual Inspection Checklist - Builder Punchlist?

Residential Air Leakage and Insulation Installation Checklist

ECCCNYS-2020
Table 402.4.1.1

Date: _____ Name of Evaluator(s): _____

Building Name & Address: _____ Conditioned Floor Area: _____ ft²

Building Contact: Name: _____ Phone: _____ Email: _____

Compliance Approach: Prescriptive (402.1.2 or 402.1.3) UA Trade-off (402.1.4) Building Performance (405) REScheck ERI Method (R406)

State: _____ Jurisdiction: _____

Building Type: 1- and 2-Family, Detached: Single Family Modular Townhouse

Multifamily: Apartment Condominium

Project Type: New Construction Addition to existing building Existing building renovation

COMPONENT	CRITERIA ^a	PLAN REVIEW			SITE INSPECTION		
		Y	N	N/A	Y	N	N/A
1. Air barrier and thermal barrier	A continuous air barrier shall be installed in the building envelope.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Exterior thermal envelope contains a continuous air barrier.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Breaks or joints in the air barrier shall be sealed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Air-permeable insulation shall not be used as a sealing material.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Ceiling/attic	The air barrier in any dropped ceiling/soffit shall be aligned with the insulation and any gaps in the air barrier sealed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Access openings, drop down stair or knee wall doors to unconditioned attic spaces shall be sealed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Walls	Corners and headers shall be insulated and the junction of the foundation and sill plate shall be sealed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The junction of the top plate and top of exterior walls shall be sealed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Exterior thermal envelope insulation for framed walls shall be installed in						

Check Your Knowledge... #3

True or False

In addition to requiring the Blower Door test on all new homes, the Energy Code also requires that the CEO conduct a Visual Inspection to Table 4.2.4.1.1, “Air Leakage and insulation Inspection...”

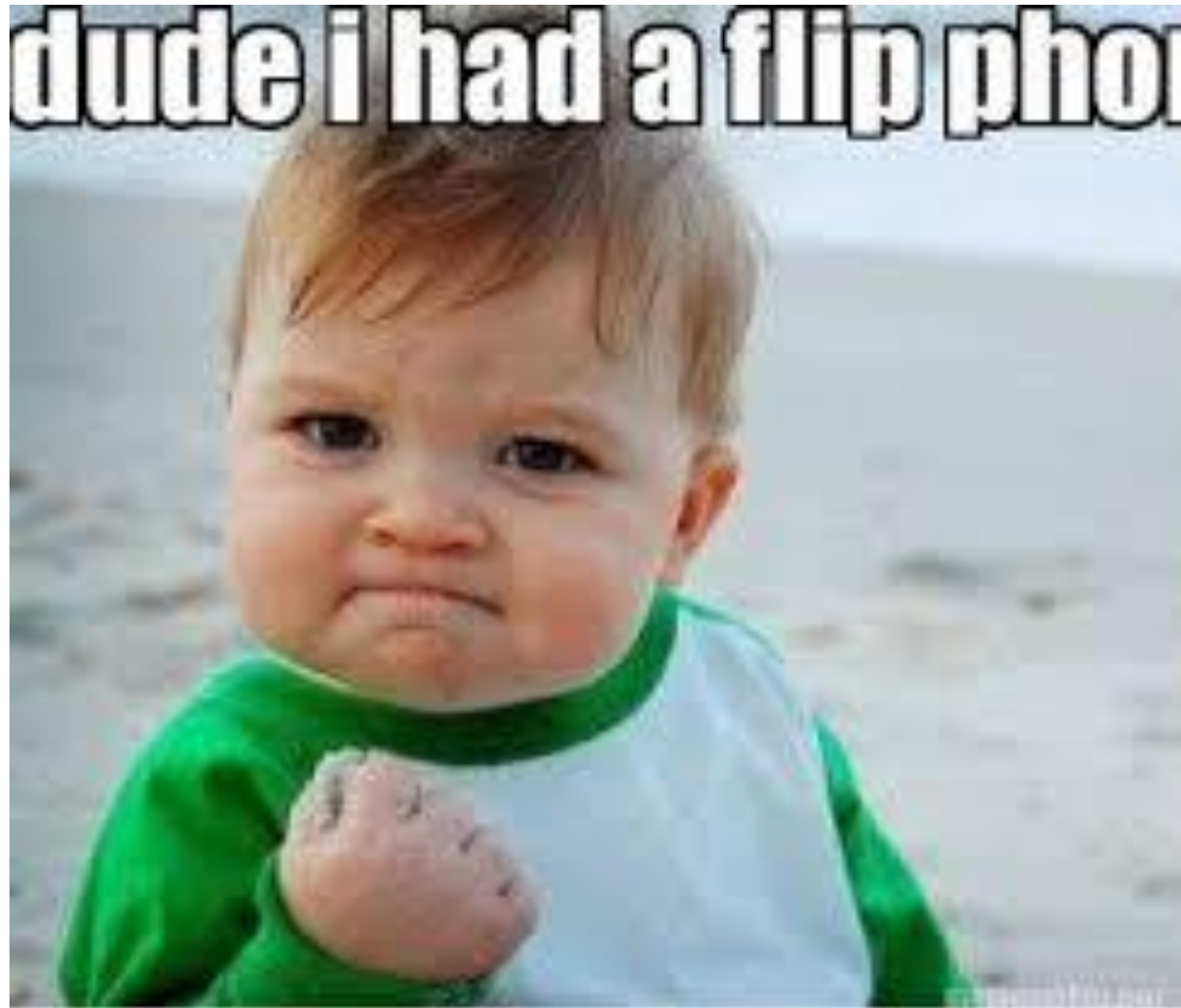
Check Your Knowledge... #3

True or False

In addition to requiring the Blower Door test on all new homes, the Energy Code also requires that the CEO conduct a Visual Inspection to Table 4.2.4.1.1, “Air Leakage and insulation Inspection...”

Answer - TRUE

Gimme a Break!



#3 - Duct System Sealing & Testing

Misunderstood
Code
Requirement



403.3.3 Duct Tightness Testing

Mandatory - IF ducts Outside Envelope

EITHER at Rough-in OR Final (Post Construction)

MUST Include Air Handler Tested to ASHRAE 193 Mfr designated on label)

Duct Tightness Thresholds (Prescriptive):

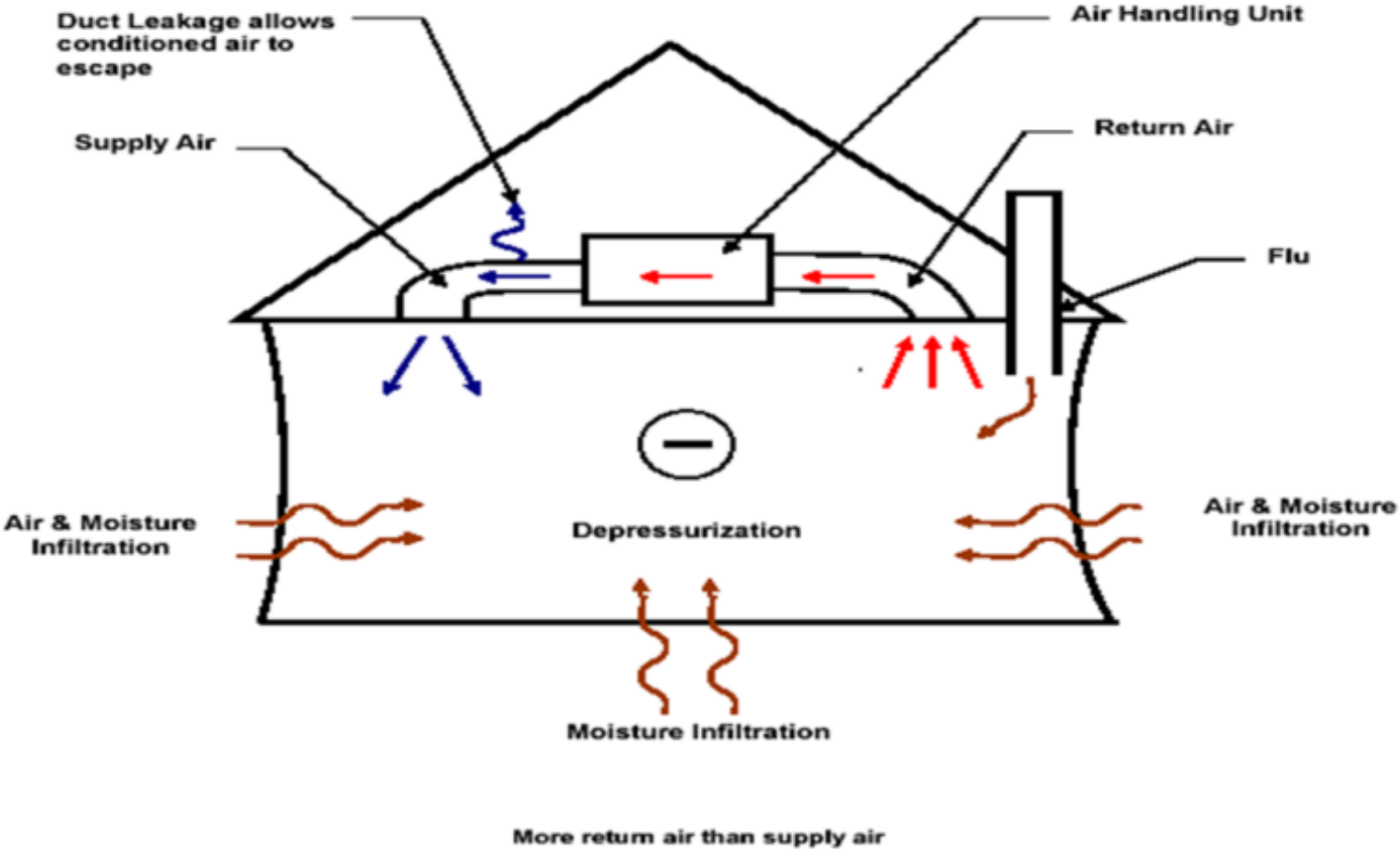
- ▶ When testing at rough-in stage with no air handler installed
 - ▶ Maximum 3 cfm per 100 s.f. - Total Leakage
- ▶ Testing at rough-in stage w/ air handler
 - ▶ Maximum 4 cfm per 100 s.f. - Total Leakage (RIT Rough-In Total Leakage)
- ▶ When testing at final (Post Construction)
 - ▶ Maximum 4 cfm per 100 s.f. - “Total Leakage” (PCT Post-Construction Total Leakage)



**ECCCNYS-2020:
Blower Door and Duct Leakage test results must be displayed on Certificate!**

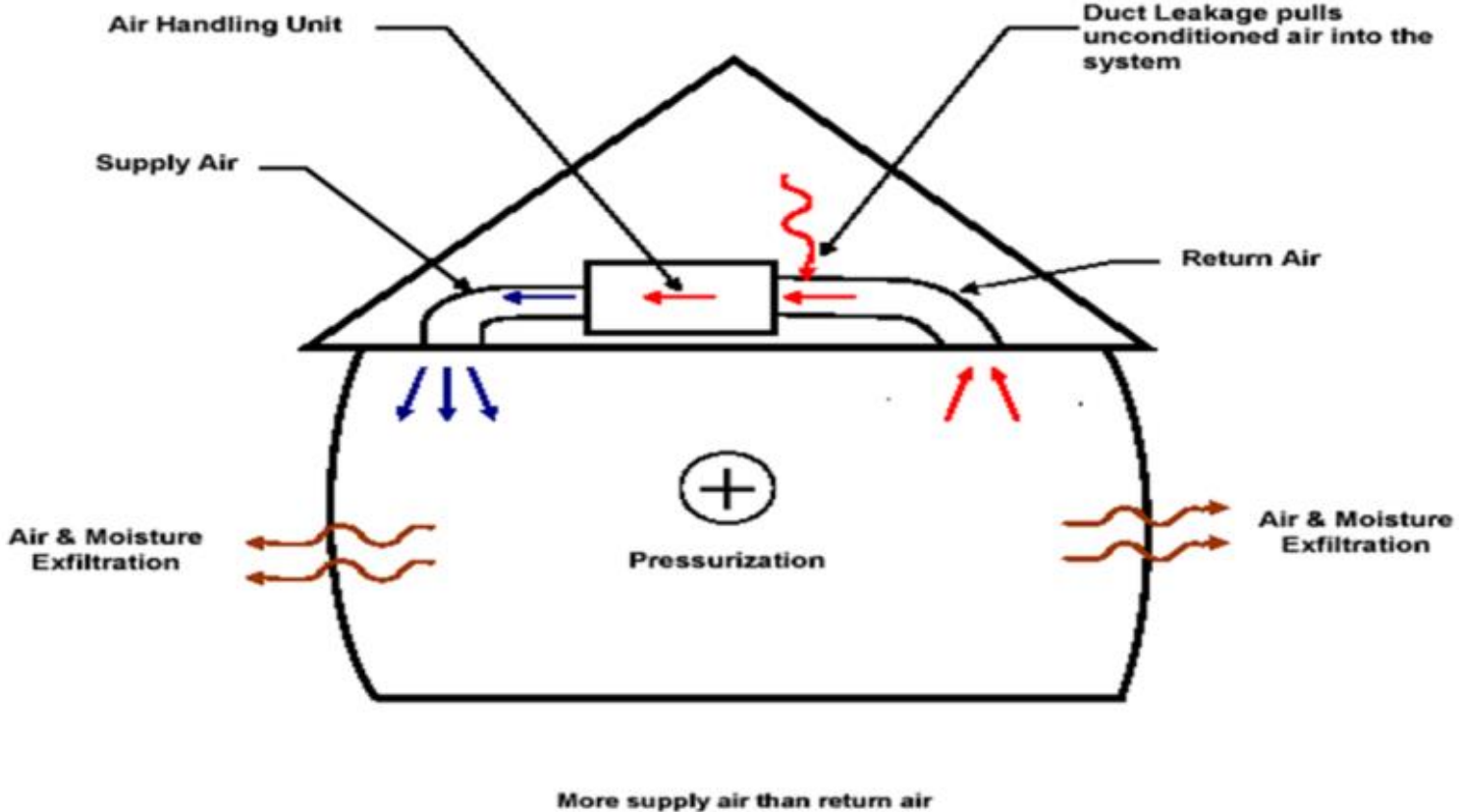
Duct Leakage: Building Pressure Issues

Supply Side Leakage



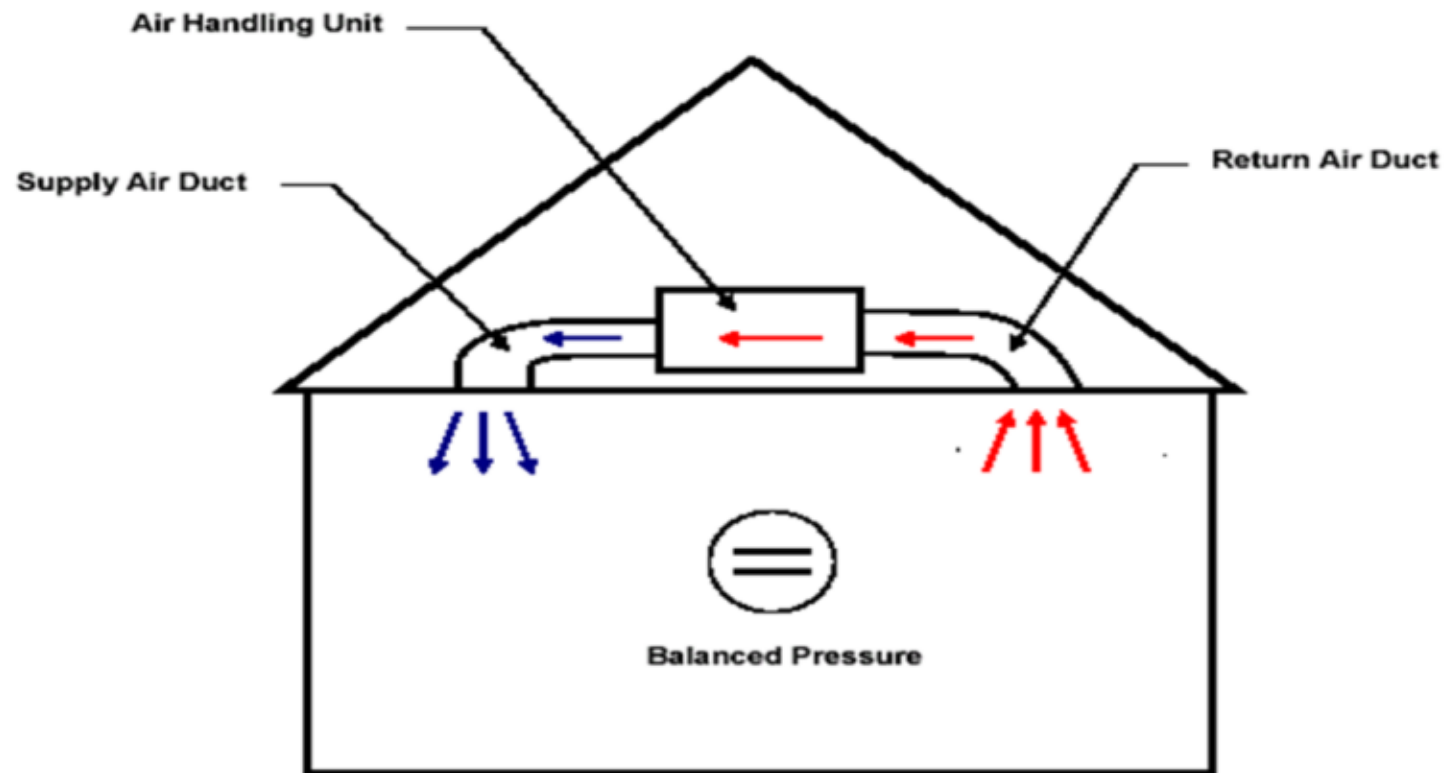
Duct Leakage & Building Pressures

Return Side Leakage



Duct Leakage & Building Pressures

Balanced System



The Good...



The Bad... & UGLY



Duct Sealing

Remember
This...??



Testing Duct Leaks - Tapes

Don't use
regular duck
tape!



Check Your Knowledge... #4

Duct Sealing: (pick all that apply)

- Can prevent backdrafting of gas appliances
- Is a requirement of the RCNYS as well as the NY Energy Code
- Is only required in renovation projects
- Isn't a necessary requirement

Check Your Knowledge... #4

Duct Sealing: (pick all that apply)

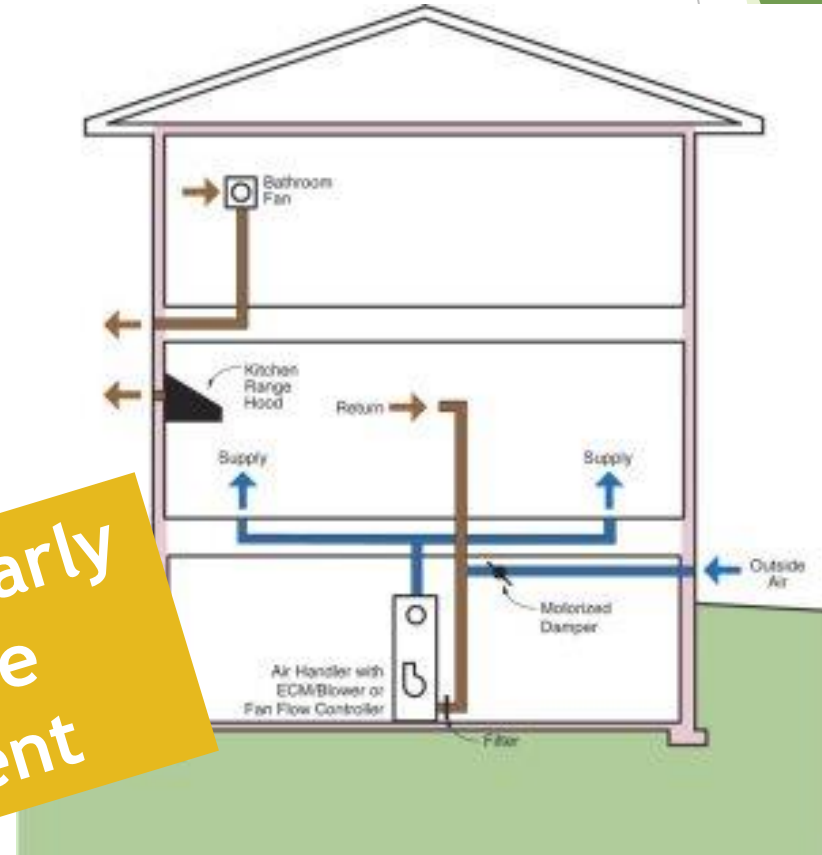
- **Can prevent backdrafting of gas appliances**
- **Is a requirement of the RCNYS and the NY Energy Code**
- Is only required in renovation projects
- Isn't a necessary requirement

#4 - Equipment Sizing

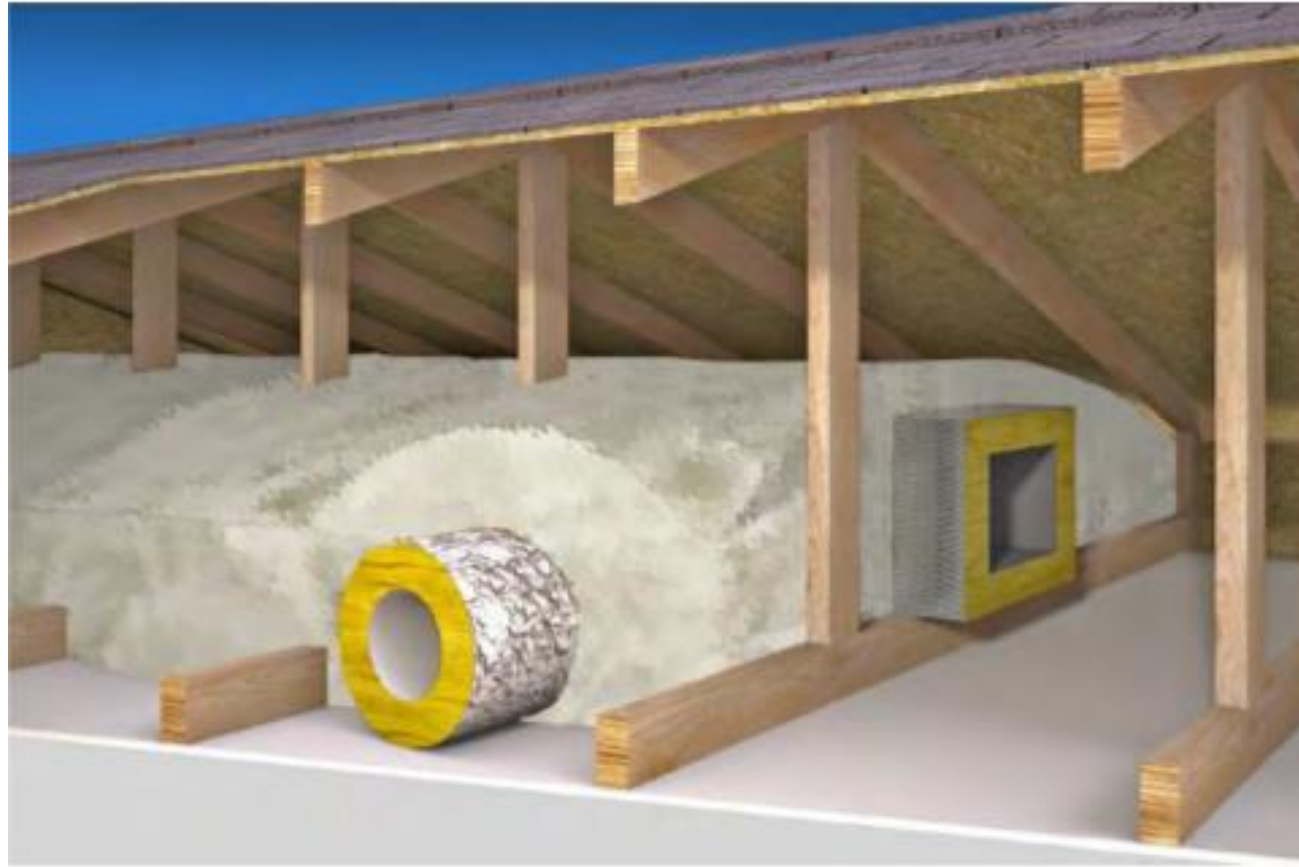
A sizing calculation is required

- ▶ ACCA Manual J or other “approved”
- ▶ Manual S-Sizing
- ▶ Manual D Duct Design
- ▶ *Residential Code of New York (Section M1401.3)*

New, More Clearly Stated Code Requirement



- New For 2020...Buried Ducts



Min. R-8 Insulated Duct

Min. R-19 buried above/below duct

Sizing Heating Systems

- ▶ Undersized
- ▶ Properly Sized
- ▶ Oversized

BIGGER is NOT BETTER!

#5 - Chapter 4 PRESCRIPTIVE Requirements

- ▶ **IF** Using Prescriptive - All Components of the Building Must Meet Strict Minimum Requirements

[NY] TABLE R402.1.2

INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT^a

CLIMATE ZONE	FENESTRATION U-FACTOR ^b	SKYLIGHT ^b U-FACTOR	GLAZED FENESTRATION SHGC ^{b, c}	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE ^f	FLOOR R-VALUE	BASEMENT ^g WALL R-VALUE	SLAB ^d R-VALUE & DEPTH	CRAWL SPACE WALL R-VALUE
4	0.32	0.55	0.40	40	20 or 13+5 ^h	8/13	10	10/13	10, 2 ft	10/13
5	0.30	0.55	NR	49	20 or 13+5 ^h	13/17	30 ^k	15/19	10, 2 ft	15/19
6 Option 1	0.30	0.55	NR	49	20+5 ^h or 13+10 ^h	15/20	30 ^k	15/19	10, 4 ft	15/19
6 Option 2	0.28	0.55	NR	60	23 cavity	15/20	30 ^k	15/19	10, 4 ft	15/19

- ▶ Rock Wool can ALSO use Option 2

#5 - OPTION for Prescriptive - And High Performance

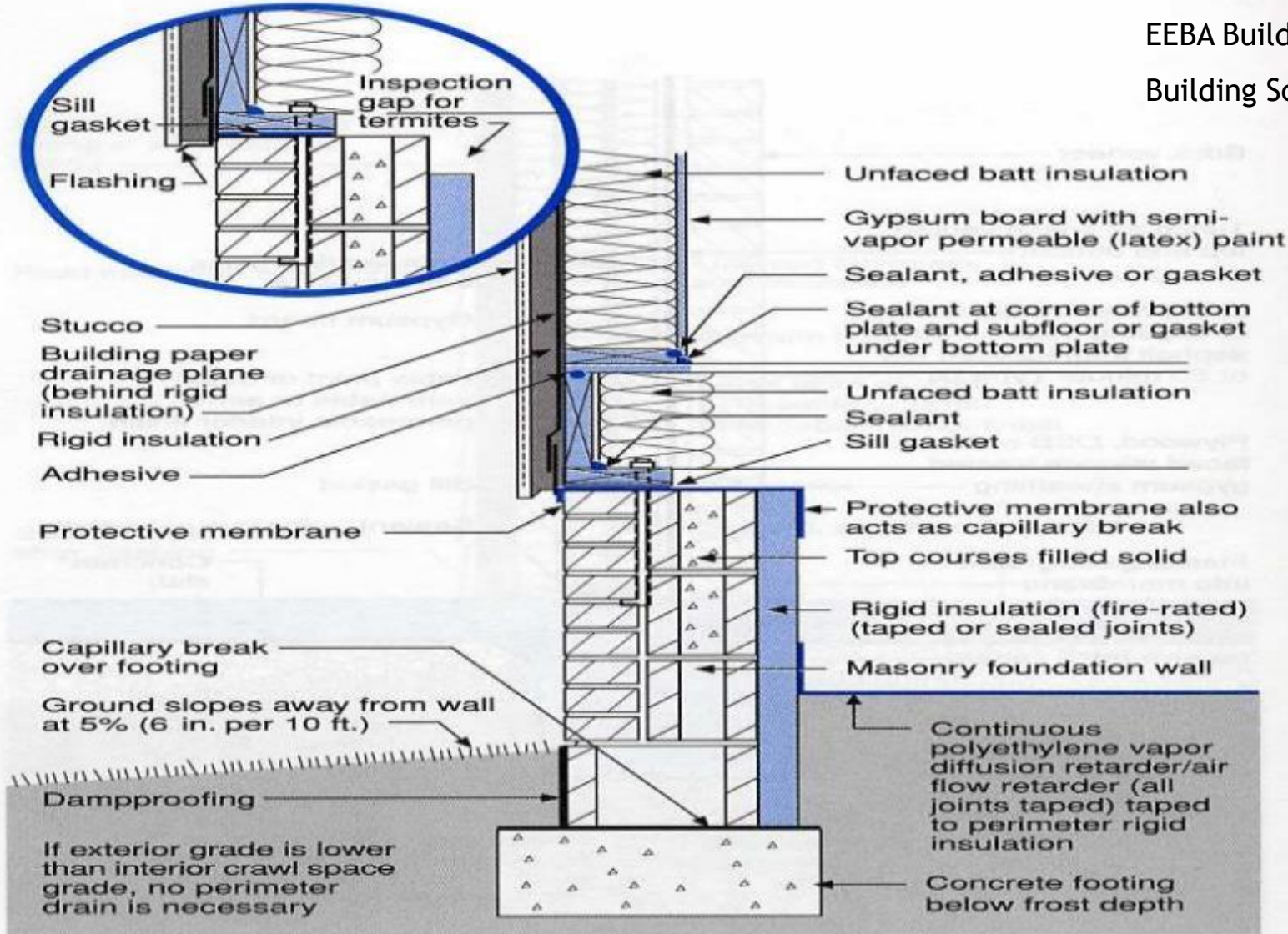
IF Using Prescriptive - All Components of the Building Must Meet Strict Minimum Requirements

- ▶ **High Density Foam to R-23 in Cavity**
- ▶ **Higher Performance Windows- U-.28**
- ▶ **R-60 in Ceiling**
- ▶ **Maybe Higher Performance FG, Slag Wools PLUS Lower Thickness Exterior Insulated Sheathing?**
 - ▶ Check with NYS-DOS, Local Code Official
- ▶ **With the 2018 IECC Adoption**
 - ▶ **R-23 option in CZ 6, to enable slag wool use as higher- performance; R-60 Roof, U-.28 windows**

Is This a Good Idea?



Alternative Detail



EEBA Builders Guide
Building Science Corp.

6 - REScheck™ Software Still works!

- ▶ NY Version WILL BE available, useable
- ▶ Self-contained
 - ▶ Includes all references and Mandatory, Prescriptive requirements
 - ▶ NO Equipment Tradeoff, Window Area Little Impact



6 - REScheck™ & BECP Website

Building Energy Codes Program

Building Energy Codes

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U.S. Department of Energy » Energy Efficiency and Renewable Energy » Building Technologies Office » BECP Home

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Status of State Energy Codes

Select a state

News

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Permit Number

Checked By/Date

REScheck Compliance Certificate

New York State Energy Conservation Construction Code

REScheck Software Version 3.5 Release 1

Data filename: D:\Program Files\Check\REScheck\ny example 1.rck

COUNTY: Albany

STATE: New York

HDD: 6894

CONSTRUCTION TYPE: Detached 1 or 2 Family

HEATING TYPE: Non-Electric

DATE: 12/20/02

COMPLIANCE: Passes

Maximum UA = 401

Your Home UA = 390

2.7% Better Than Code (UA)

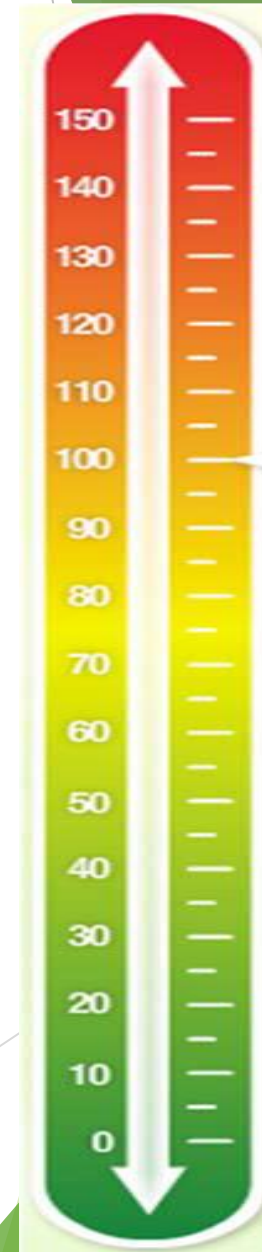
**Compliance
Certificate**

	<u>Gross Area or Perimeter</u>	<u>Cavity R-Value</u>	<u>Cont. R-Value</u>	<u>Glazing or Door U-Factor</u>	<u>UA</u>
Ceiling 1: Flat Ceiling or Scissor Truss	1600	38.0	0.0		47
Skylight 1: Metal Frame with Thermal Break:Double Pane with Low-E	28			0.450	13

#7 - HERS-As-Codes/ERI/Performance Compliance Energy Rating Index with ECCCCNYS 2020 ERI Values Now LOWER

- ▶ Most Flexible Performance Approach, Most Cost-Effective
- ▶ Many Homes at or near Energy Star
- ▶ MUST work with a Rater
- ▶ Get a Rater to help Demo Compliance
- ▶ Go to Energy Star for Recognition if so desired.

Climate Zone Z4	Climate Zone Z5	Climate Zone Z6
62	61	61



REM/Rate Sample Report

- ▶ Total annual energy costs
- ▶ Duct insulation
- ▶ Window U-factor and SHGC
- ▶ Envelope and duct testing
- ▶ Compared between Energy Code and actual home

2009 IECC ANNUAL ENERGY COST COMPLIANCE			
Date:	August 04, 2010	Rating No.:	
Building Name:	ACME House	Rating Org.:	Southface Energy Rated Homes
Owner's Name:	Mike Barcik	Phone No.:	
Property:	Willie E. Coyote Road	Rater's Name:	Diana Burk
Address:	Atlanta, GA 30308	Rater's No.:	
Builder's Name:		Rating Type:	Based On Plans
Weather Site:	Atlanta, GA	Rating Date:	7/18/10
File Name:	Burk_Plan2_CM_DB_CM_QAD.big		

	Annual Energy Cost	
	2009 IECC	As Designed
Heating:	530	514
Cooling:	214	220
Water Heating:	271	256
Lights & Appliances:	555	555
Photovoltaics:	-0	-0
Service Charge:	120	120
Total:	1689	1666 *
Duct Insulation R-Value Check (per Section 405.2)		
Minimum Duct Insulation (Design must be higher):	6.0	6.0
Window SHGC Check (per Section 402.5)		
Window SHGC Value (Design must be lower):	0.500	0.310
Home Infiltration per Section 402.4.2:		PASSES
Duct Leakage per Section 403.2.2:		PASSES

This home MEETS the annual energy cost requirements in accordance with Section 405 of the 2009 International Energy Conservation Code based on a climate zone of 3A.

Name: Diana Burk Signature: _____
Organization: Southface Energy Rated Homes Date: August 04, 2010

* Design energy cost is based on the following systems:
ASHP: Htg: 70.1 kBtu/h, 7.7 HSPF; Clg: 36.0 kBtu/h, 13.0 SEER.
Water Heating: Conventional Elec, 0.95 EF
ASHP: Htg: 64.1 kBtu/h, 8.0 HSPF; Clg: 30.0 kBtu/h, 13.0 SEER.
Window-to-Floor Area Ratio: 0.15
Code default: Htg: 0.35 Clg: 0.35 ACHnat

In accordance with IECC, building inputs, such as setpoints, infiltration rates, and window shading may have been

REM/Rate - Residential Energy Analysis and Rating Software v12.83
The information does not constitute any warranty of energy cost or savings.
© 1985-2010 Architectural Energy Corporation, Boulder, Colorado

#8 - 90% High-Efficiency Lighting

- ▶ Bulbs, NOT Necessarily Fixtures
- ▶ Can be met with CFLs or LEDs



#9 - Existing Buildings Covered - Renovations, Additions, Alterations, Repairs

- ▶ Existing Buildings
- ▶ Additions
- ▶ Alterations
- ▶ Repairs!
- ▶ Make Sure Your Renovation Work COMPLIES!

KEY For Residential, Commercial and Combination Construction Types!

FEW Jurisdictions Enforce for Existing Buildings!

#10 - Residential Ventilation - Required On All Homes

- ▶ Whole-House Ventilation - Residential Code and Energy Code
- ▶ Exhaust-Only
- ▶ Supply Only
- ▶ Balanced
- ▶ HRV/ERV Qualifies, BUT May Not Need To Go That Far!
- ▶ NYS-DOS says Makeup Air Critical
- ▶ ***More To Come in 2020! - “Residential Ventilation Demystified...”!***

KEY For Residential - Health, Life, Safety, IAQ, Liability, Better More Comfortable Home!

NYS Residential Code Ventilation Requirements...

ECCCNYS–2020 requires Sec R403.6 & Table)

- Fans must be energy efficient
- **Whole-house mechanical ventilation system**

RCNYS-2020 – Sec. 1505 & Tables

- **Whole-house mechanical ventilation system**
- **CAN** be exhaust-only, supply-only, or balanced
- ***IMPLIED that makeup air be supplied***
- **Bath Fans CAN** be part of the system for exhaust
- **Must have automatic control with accessible shutoff**
- **Can be operated full time or intermittently**

NYS Residential Code Ventilation Requirements...

Whole-house mechanical ventilation system

“An exhaust system, supply system, or combination thereof that is designed to mechanically exchange indoor air for **outdoor air** where operating continuously or through a programmed intermittent schedule to satisfy the whole-house ventilation rate.”

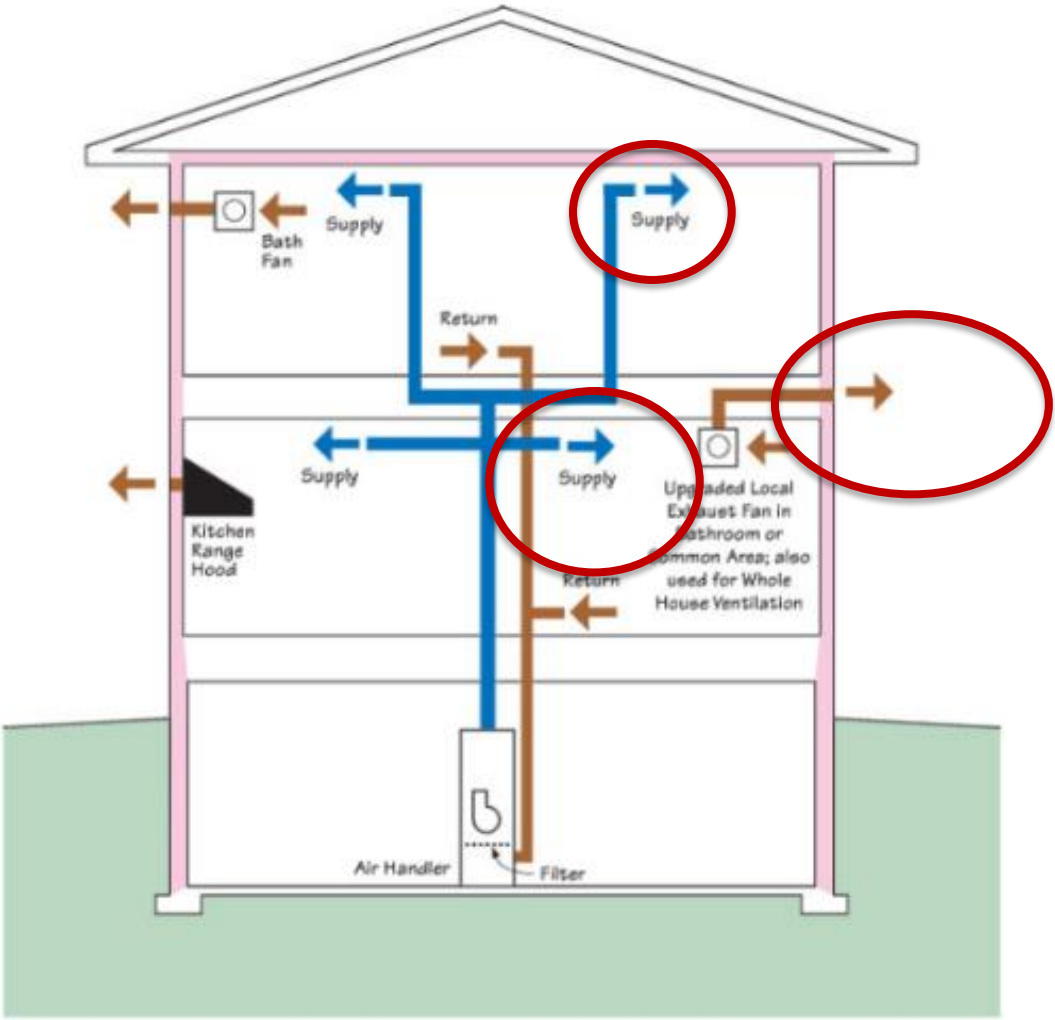
FIRST implication that makeup needed - “exchange indoor air for outdoor...”

N1103.6.2 Mechanical Testing and Verification



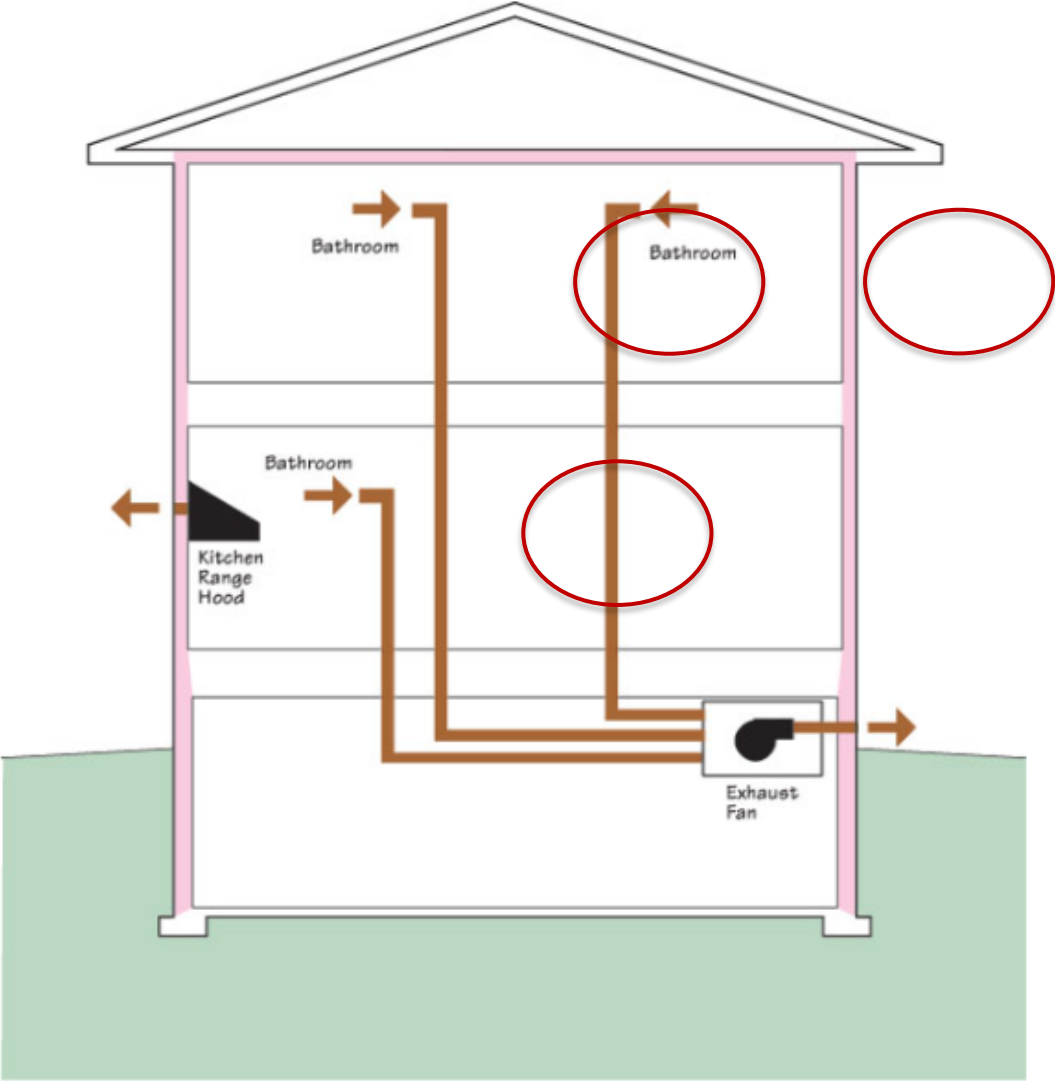
Mechanical Ventilation

Single-Point Exhaust Ventilation



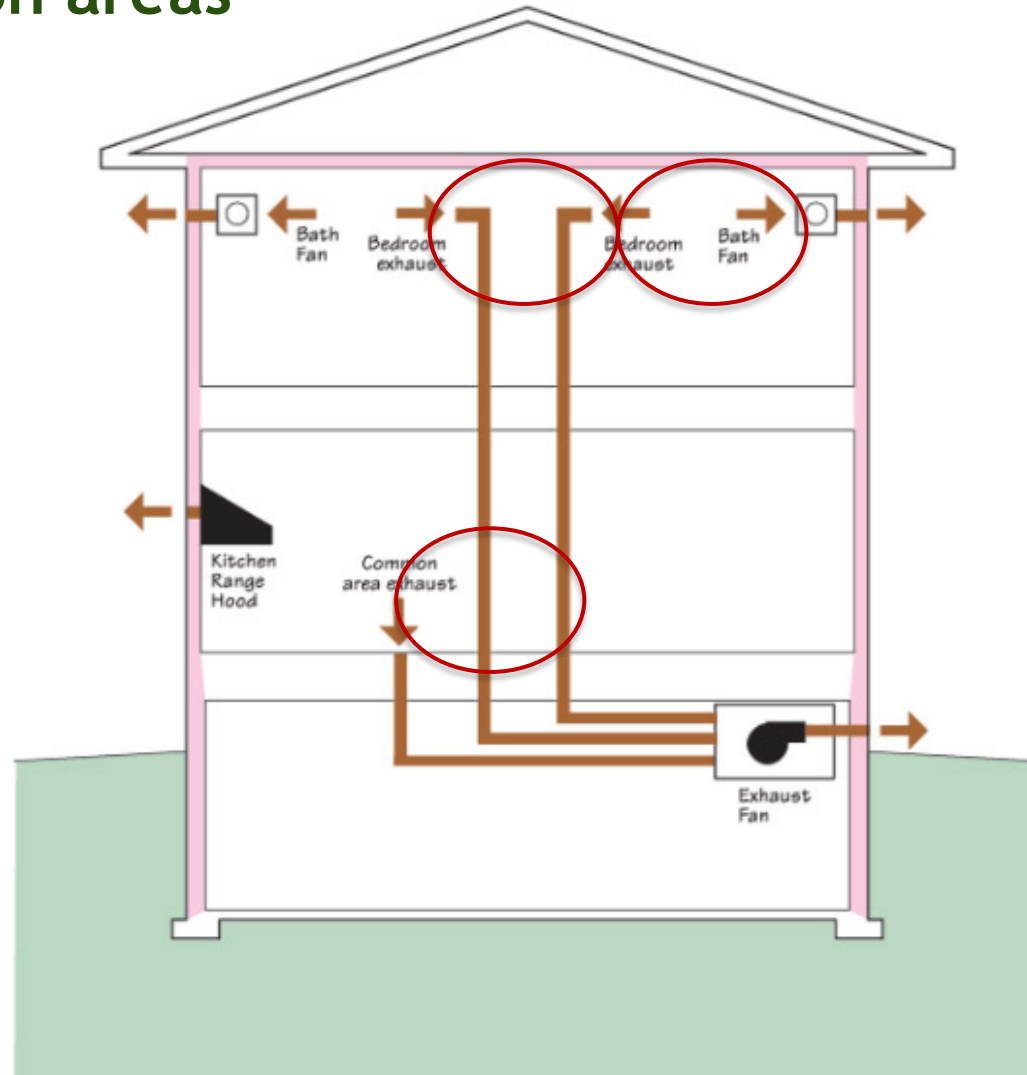
Mechanical Ventilation

Multi-point Exhaust Ventilation from bathrooms



Mechanical Ventilation

Multi-point Exhaust Ventilation from bedrooms/common areas



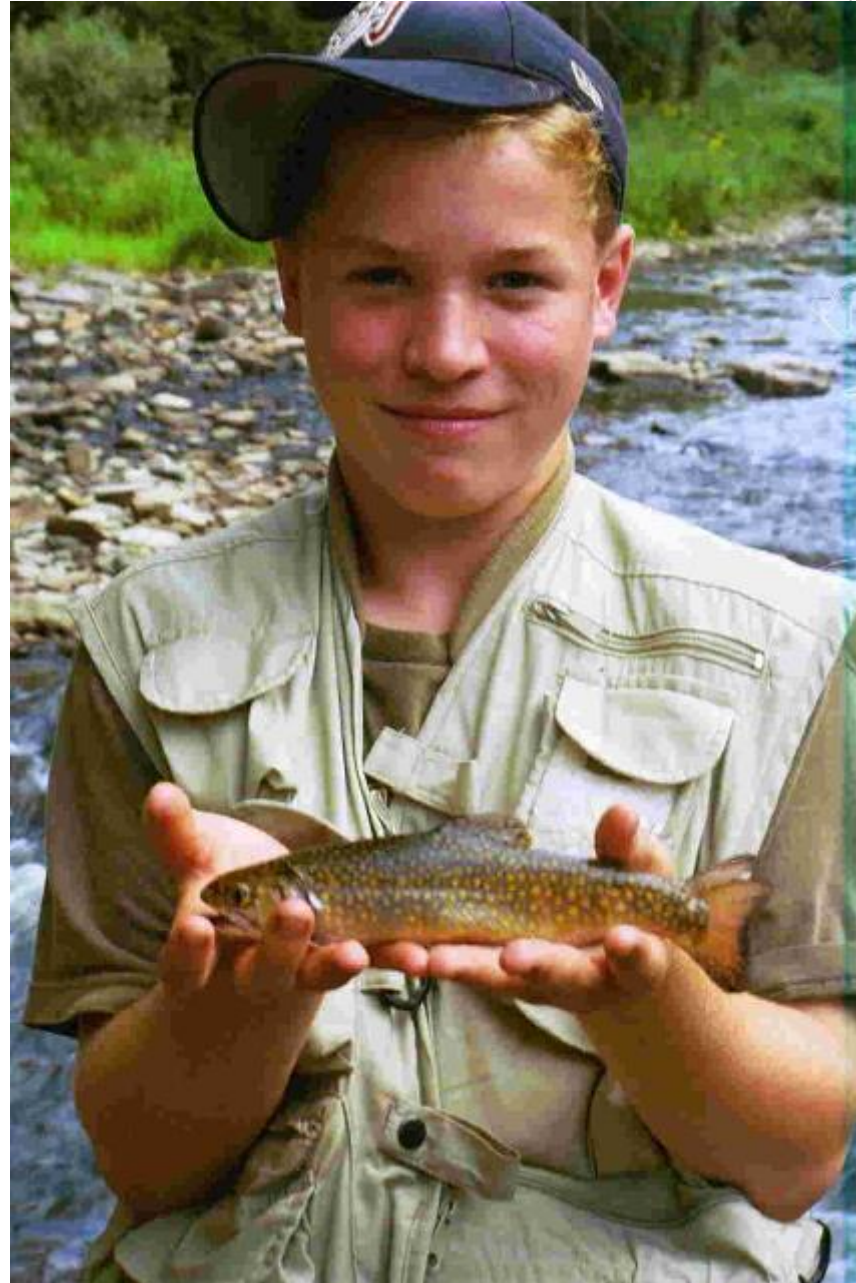
QUESTIONS?



Technical Support

- ▶ NYS - DOS
518.486 - 6990
- ▶ US-DOE
1-800-270-CODE
www.energycodes.gov

**Why I do this
stuff!**



So...What Do We Do Next?

- ▶ **LEAD** - Energy Code Compliance in YOUR Communities
- ▶ SUPPORT YOUR First Responders and CODE OFFICIALS
- ▶ SUPPORT NFBOA, NYSBOC & NYS-DOS Codes
- ▶ Remember Renovation Too
- ▶ Good Insulation Details!
- ▶ Build tight, Ventilate Right



North Branch Services

Mike DeWein

President

518-369-7545

dewein53@gmail.com

- Training
- Air Barrier Audits
- Building Diagnostics
- Energy Plan Review: Inspection
- Thermal Imaging

**SUPPORT NYSBOC, NACEOA Fire
Officials, NYS-DOS Codes!**



I WANT YOU