



NYStretch For Residential Buildings Part 1

NYStretch Overview and Thermal Envelope Requirements


Performance Systems Development (PSD)



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Introductions 

Presented by:
Performance Systems Development



Chris Whittet
Energy Codes Specialist
Presenter

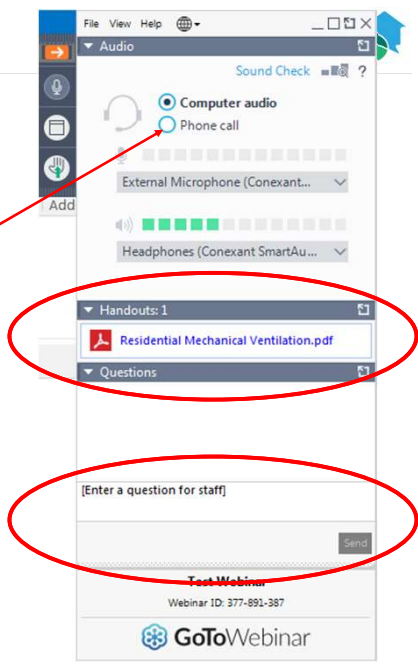
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Logistics

- Audio Settings
- Questions
- Handouts
- Polls (exit full screen)
- Recordings

If you can't hear anything right now...
You may select "Phone call" in the Audio portion of the control panel. Dial the number and enter the access code.



The screenshot shows a webinar control panel with several sections. The 'Audio' section at the top has 'Computer audio' selected, with 'Phone call' as an option. Below it are microphone and speaker settings. The 'Handouts' section shows a PDF titled 'Residential Mechanical Ventilation.pdf'. The 'Questions' section has a text input field with the placeholder '[Enter a question for staff]' and a 'Send' button. At the bottom, the 'GoToWebinar' logo and 'Webinar ID: 377-891-387' are visible.

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Continuing education

This webinar is approved for:

- 1.5 hours NYDOS In-service Training, Topic 3 – Energy Code
- 1.5 AIA LU | HSW
- 1.5 BPI CEUs


Everyone will receive a certificate of attendance

NYDOS Course Number:
T02-07-2977



The certificate is from 'Performance Systems Development' and awards credit to 'Your Name'. It is dated 'January 20, 2021'. The certificate includes a signature line for 'Mike Tarns, Trainer' and the Performance Systems Development logo.

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All Attendees 

To receive credit, you must:

- Login using a computer or tablet,
- Login no later than 15 minutes after the scheduled start time,
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 - The scheduled end time if the webinar ends late, or
 - The actual end time if the webinar ends early.

➤ Code officials: Please allow at least three weeks for training to show up in your SLMS training history.

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Agenda

- ✓ Introduction and NYStretch Overview
- ✓ Benefits
- ✓ Intent
- ✓ Overlay to the base code
 - Compliance path options
- ✓ Building Thermal Envelope mandatory requirements
- ✓ Overview of differences between the base code and the NYStretch Code

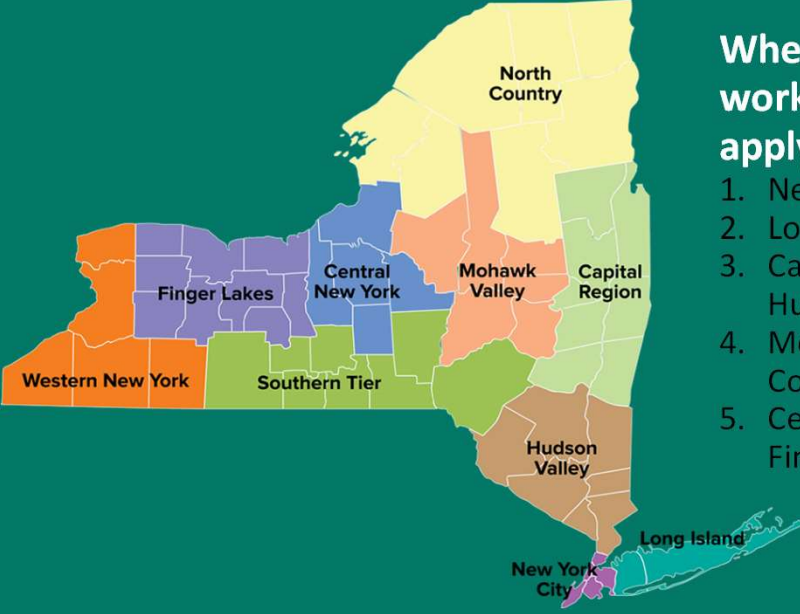
Learning Objectives

After taking this course, attendees will be able to...

1. Understand the intent and savings potential of the residential provisions of NYStretch.
2. Identify all available energy code compliance pathways under NYStretch
3. Identify differences between NYStretch (or NYCECC) and the base energy code
4. Identify and understand mandatory requirements (items that must be met regardless of compliance path)

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POLL 1



Where do you perform work? Choose all that apply.

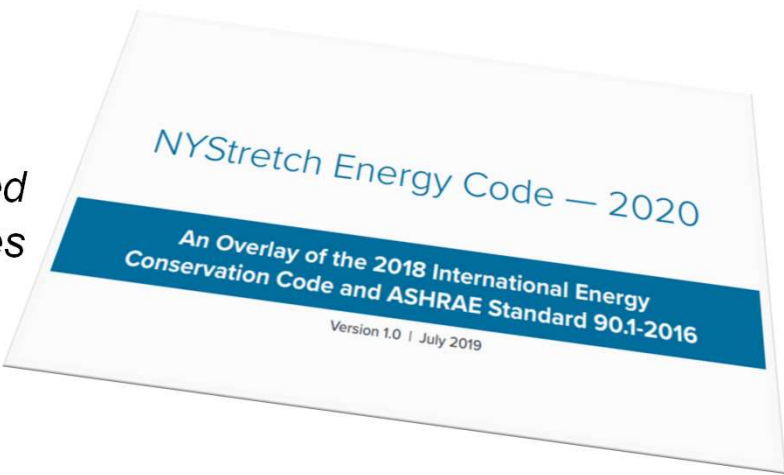
1. New York City
2. Long Island
3. Capital Region / Hudson Valley
4. Mohawk Valley / North Country
5. Central / Southern Tier / Finger Lakes / Western NY

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What is a Stretch Code?

Stretch code definition:
An energy code that can be easily adopted by local municipalities which results in a higher level of efficiency than the statewide “base energy code”



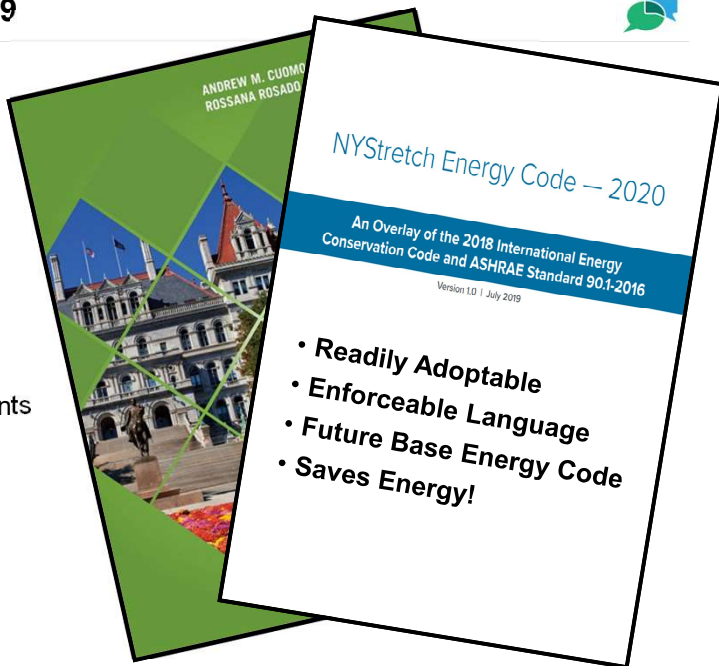
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NYSTRETCH – Published July 2019

NYStretch Commercial & Residential requirements work together with the base New York Energy Conservation Construction Code

- Chapter 1:** Scope and Administration
- Chapter 2:** Definitions
- Chapter 3:** General Requirements
- Chapter 4:** Energy Efficiency Requirements
- Chapter 5:** Existing Buildings
- Chapter 6:** Referenced Standards
- Appendix
- Index



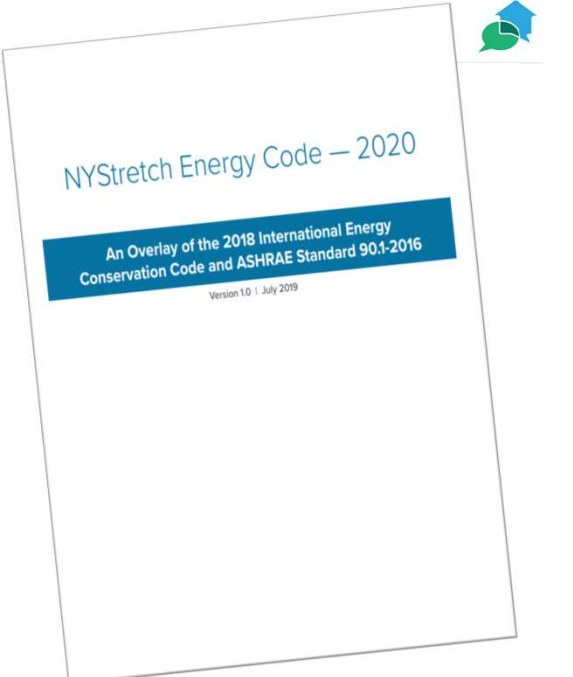
The image shows the cover of the 'NYStretch Energy Code -- 2020' book. The cover is white with a blue banner at the top that reads 'NYStretch Energy Code -- 2020' and 'An Overlay of the 2018 International Energy Conservation Code and ASHRAE Standard 90.1-2016'. Below the banner, it says 'Version 1.0 | July 2019'. The main title is in blue. Below the title, there are three bullet points: '• Readily Adoptable', '• Enforceable Language', and '• Future Base Energy Code'. At the bottom, it says '• Saves Energy!'. The authors' names, 'ANDREW M. CUOMO' and 'ROSSANA ROSADO', are at the top right. The cover also features a photograph of a building facade.

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NYStretch Code - Residential

3	Amendments to 2018 International Energy Conservation Construction Code Residential Provisions	56
3.1	Amendments to Section 401.2	56
3.2	Amendments to Table R402.1.2	56
3.3	Amendments to Table R402.1.4	57
3.4	Amendments to Section R402.2.2	57
	Includes requirements that have been amended or added to the base NYS Energy Code	58
		58
		58
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		60
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		61
		61
3.15	Amendments to Table R406.4	61
3.16	Addition of New Section R408	62
3.17	Amendments to "ACCA" in Chapter 6	63
3.18	Addition of a new entry for "IAPMO" to Chapter 6	63
3.19	Addition of a new entry for "PHI" to Chapter 6	64
3.20	Addition of a New Entry for "PHI" to Chapter 6	64

Residential Section of the NYStretch Code is 8 Pages in length



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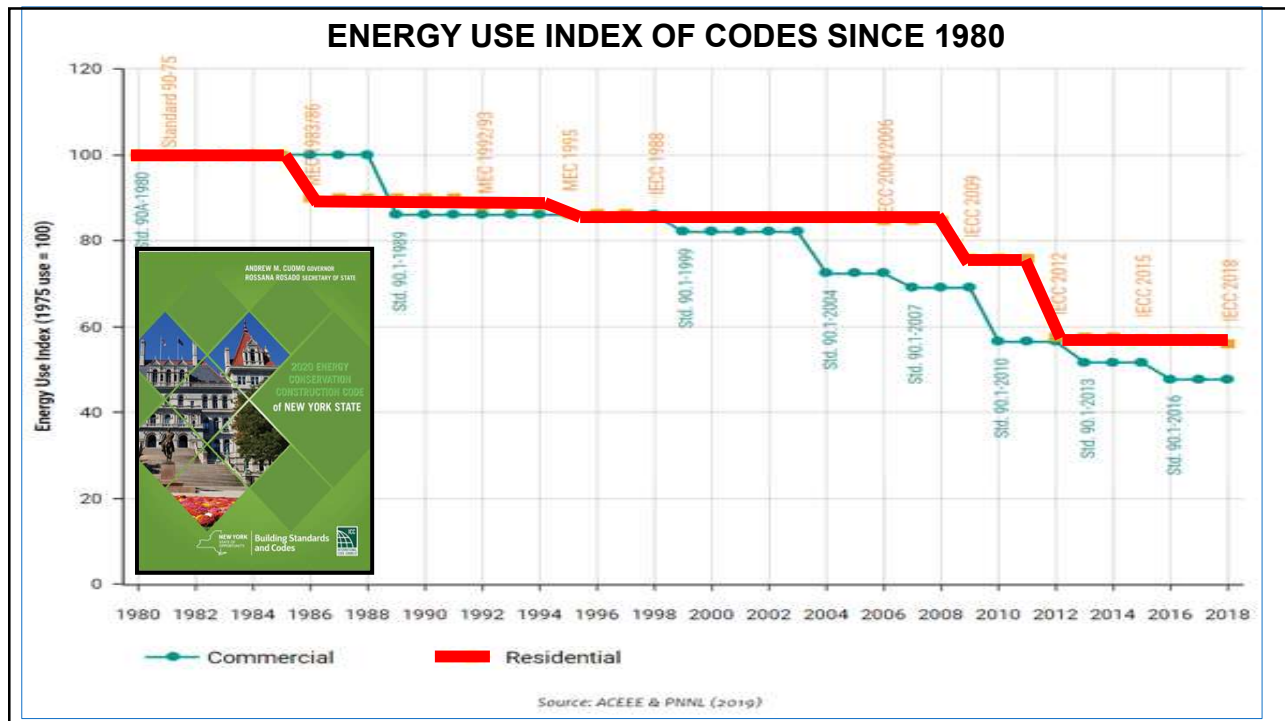
NYStretch Benefits



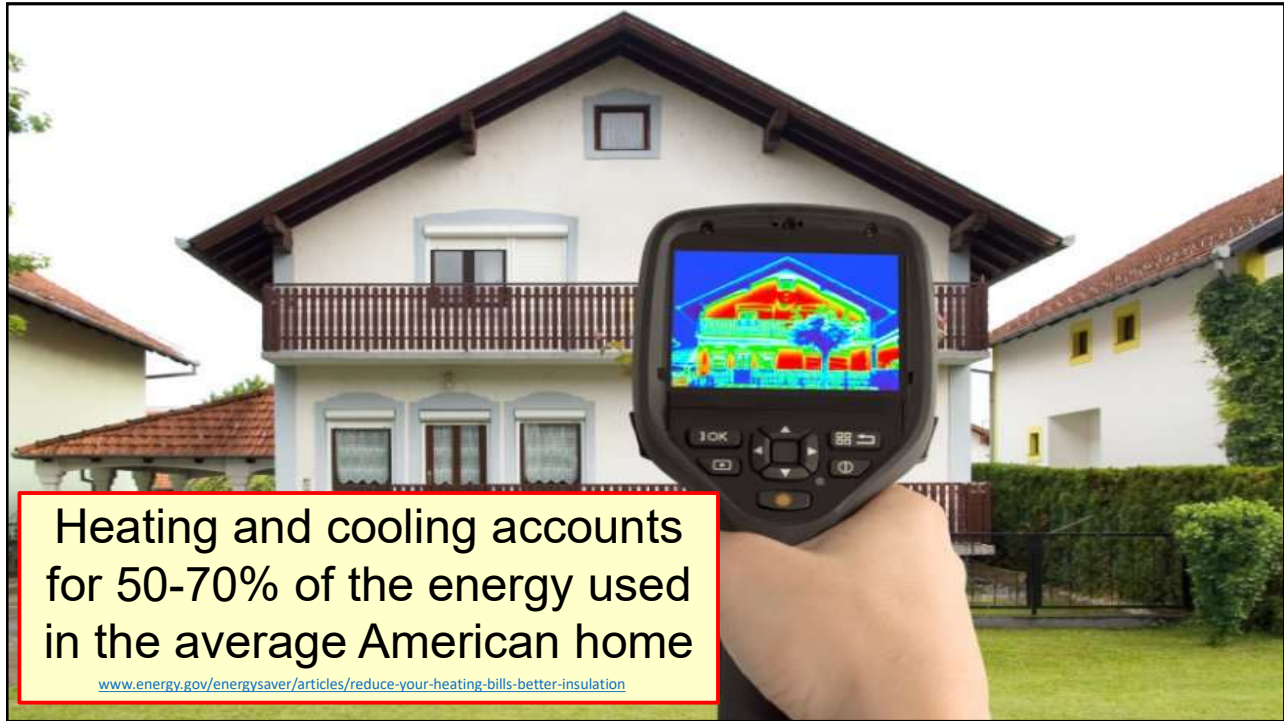
- ✓ NYStretch homes use less energy, have lower utility bills, increased comfort and better building envelopes
- ✓ Occupants of NYStretch homes will benefit from long-term energy and cost savings
- ✓ NYStretch gives local communities more flexibility to further their carbon reduction and sustainability goals
- ✓ NYStretch helps show what's possible for future Energy Code enhancements
- ✓ **Energy savings!!!**



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Typical Energy Use in Homes

13-28% of energy use is due to air leakage

Unwanted air leakage also causes comfort problems, negatively impacts humidity levels and can reduce insulation effectiveness

Major Sources of Air Leaks

Source of Air Leak	Percentage
Floors, walls and ceilings	31%
Windows	10%
Doors	11%
Ducts	15%
Fireplace	14%
Plumbing Entries	13%
Electrical Outlets	2%
Fans and Vents	4%

Data source: U.S. Department of Energy Savers - Stopping Air Leaks
Image source: InsulationSmart.com

www.energystar.gov/ia/home_improvement/home_sealing/AirSealingFS_2005.pdf

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NYStretch Residential Energy and Cost Savings

NYStretch Energy Code — 2020

An Overlay of the 2018 International Energy Conservation Code and ASHRAE Standard 90.1-2016

Version 1.0 | July 2019

Residential provisions result in approximately **25% energy savings** over the 2020 ECCC NY

Table 2. Statewide Average Annual Energy and Cost Savings — Residential Provisions of NYStretch Compared to the 2020 ECCC NYS²

	Total Regulated Site Energy (kBtu/dwelling unit)	Total Regulated Source Energy (kBtu/dwelling unit)	Total Energy Costs (\$/dwelling unit)
Baseline	59,926.4	91,545.1	1,514.9
2020 NYStretch	45,161.4	71,769.2	1,216.7
Savings	24.6%	21.6%	19.7%

For more information about the 2020 New York Stretch Code, see: <https://www.nyscrda.ny.gov/All-Programs/Programs/Energy-Code-Training/NYStretch-Energy-Code-2020>

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NYStretch Intent

- ✓ NYStretch was created by NYSERDA to be “a pivotal tool for New York jurisdictions to support the State’s energy and climate goals”
- ✓ It does this by “accelerating the savings obtained through building energy codes”
- ✓ Authorities Having Jurisdiction (AHJ) have the legal ability to voluntarily adopt NYStretch

REV Clean Energy Goals for 2030

40% **Reduction**
in greenhouse gas emissions from 1990 levels

50% **Generation**
of New York State’s electricity must come from renewable energy sources

23% **Decrease**
in energy consumption of buildings from 2012 levels

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Stretch Code Local Adoptions (or Filed for Adoption)

Municipality	Region
Beacon, City of	Hudson Valley
Hastings-on-Hudson, Village of	Hudson Valley
Dobbs Ferry, Village of	Hudson Valley
Montour Falls, Village of	Southern Tier
Kingston, City of	Hudson Valley
New Rochelle, City of	Hudson Valley
Dryden, Town of	Southern Tier
Bethel, Town of	Hudson Valley
Ossining, Town of	Hudson Valley
Marbletown, Town of	Hudson Valley
Newfield, Town of	Southern Tier
Bedford, Town of	Hudson Valley
Philmont, Village of	Capital District
Athens, Village of	Capital District
Niskayuna, Town of	Capital District
Lima, Village of	Finger Lakes
Canandalgua, City of	Finger Lakes
Cortlandt, Town of	Hudson Valley
Mamaroneck, Town of	Hudson Valley

**Examples of other states and territories:
CA, MA, BC**

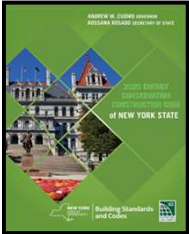
NYStretch Energy Code – 2020

An Overlay of the 2018 International Energy Conservation Code and ASHRAE Standard 90.1-2016

Version 1.0 | July 2019

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NY Energy Code Compliance Paths



The 2020 NYECCC is the base code for NYStretch with some requirements strengthened for additional energy savings

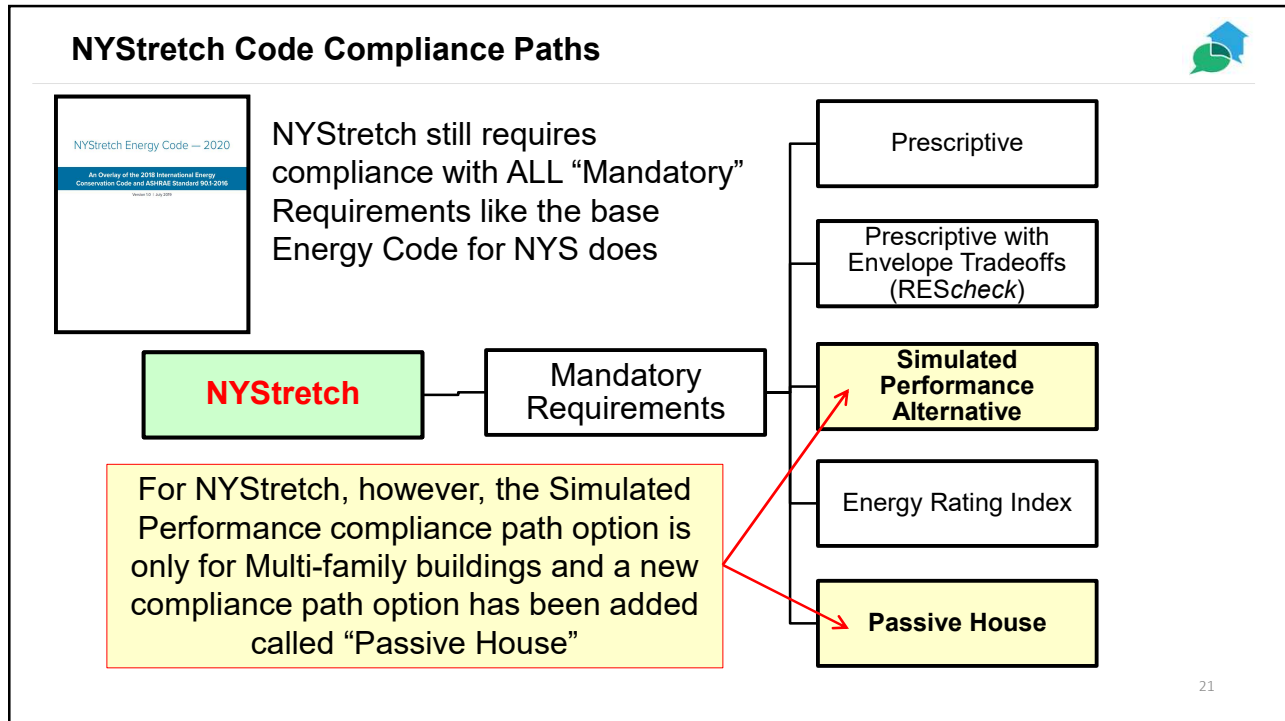
2020 ECCC NYS

Mandatory Requirements

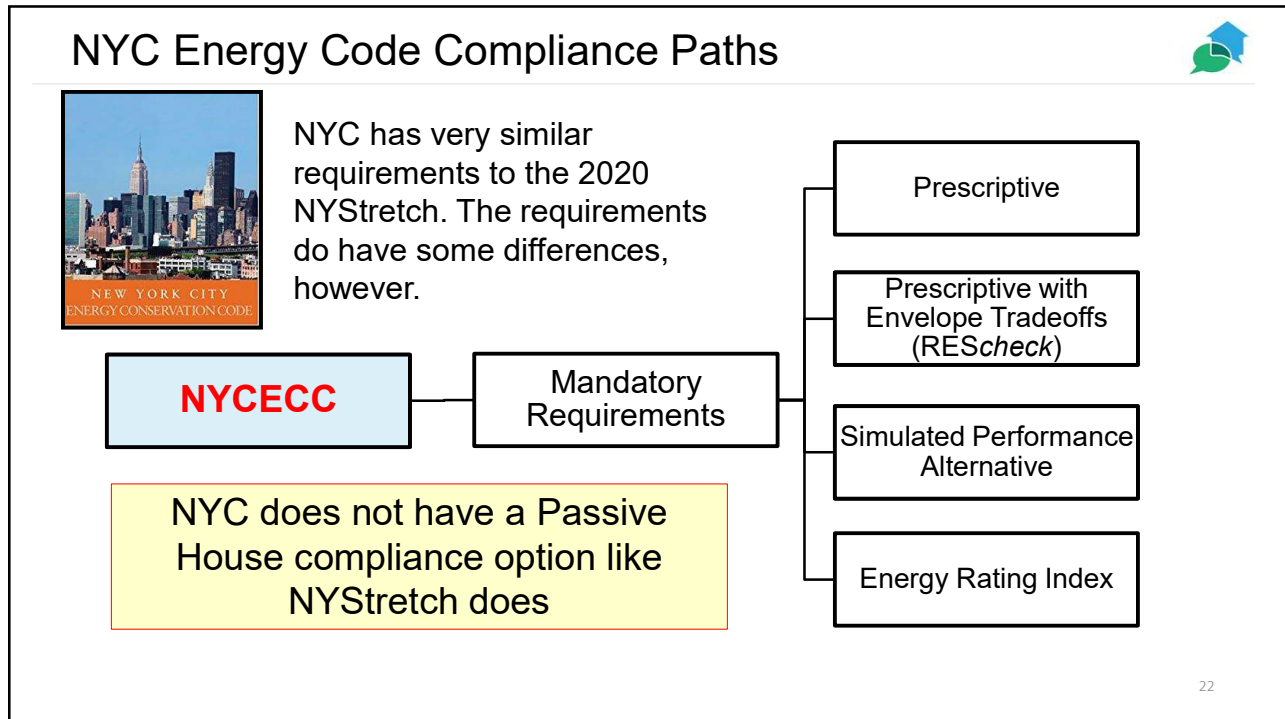
- Prescriptive
- Prescriptive with Envelope Tradeoffs (REScheck)
- Simulated Performance Alternative
- Energy Rating Index

The base Energy Code for NYS has Mandatory Requirements AND four different compliance path options for demonstrating compliance


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Today's Training - NYStretch and the 2020 NYC Energy Code Highlights 


Allowable Compliance Paths

Building Thermal Envelope:

- Better windows and skylights
- Higher insulation levels
- Insulation inspected by an approved agency
- Air Leakage Testing Requirements

Part 1
of the New York Residential Stretch Code Training

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NYStretch and 2020 New York City Energy Conservation Code Highlights 

Part 2
of the New York Residential Stretch Code Training

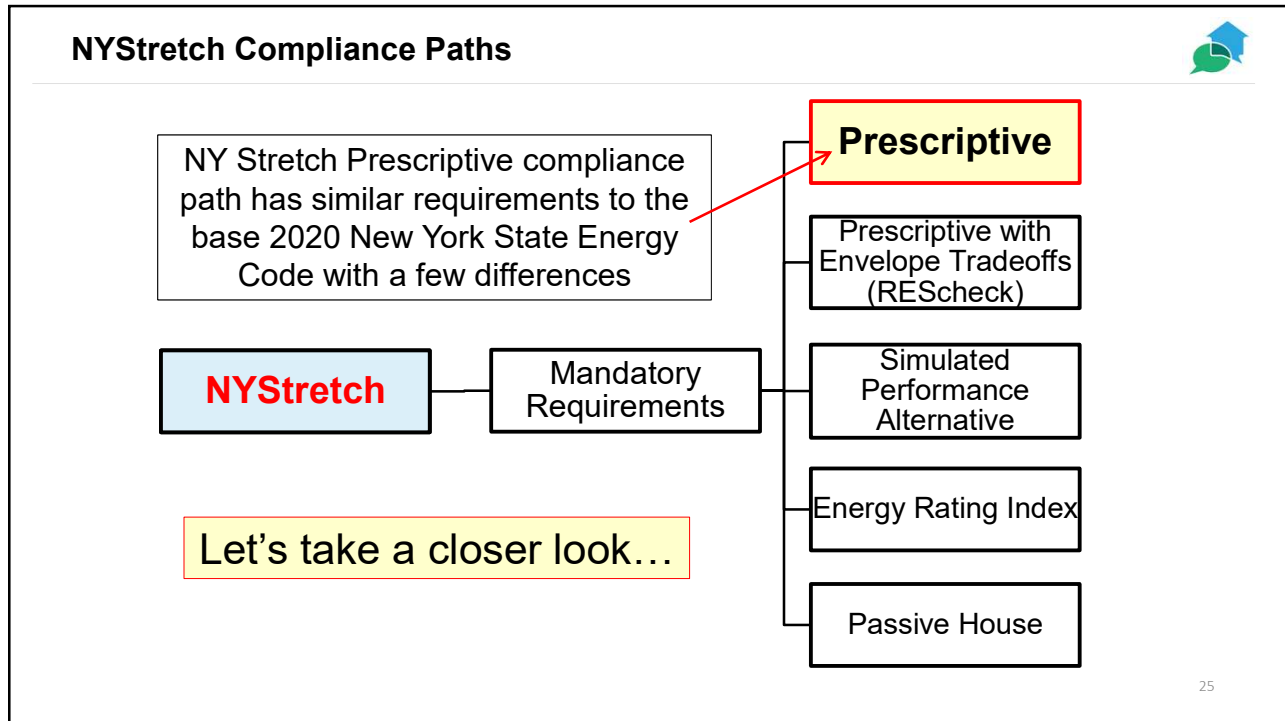
Mechanical systems:

- All ducts in conditioned space
- Ducts sized properly
- Efficient plumbing layouts
- Drain water heat recovery
- Recirculation systems
- Balanced ventilation with HRV/ERV or HVAC-integrated with ECM
- Ventilation flow testing required

Electric Power & Lighting:

- Lighting – basically requires LEDs
- Electric power packages
 - Solar-ready zone
 - EV equipment capable

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POLL #2

True or False

NYStretch offers several compliance path options that can be used by permit applicants to demonstrate compliance.

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Review of R-Values and U-Values

R-Values

- A material's R-Value is the measurement of it's Resistance to conductive heat flow
- The Larger the R-Value the better the Resistance to heat flow
- Used mainly for insulation products but all materials have an R-Value

Examples: R-11 or R-38 Insulation

R-Value = 1 ÷ U-Value

R-Value = 1 ÷ .05 = 20

U-Values

- A U-Value is the measurement of a combination of material's actual heat loss (or gain)
- The Smaller the U-Value the less heat loss for the windows or building envelope component
- Used mainly for wall systems, roof/ceiling components, windows, doors, skylights, etc.

Examples: Window U=0.27, Wall U=0.10

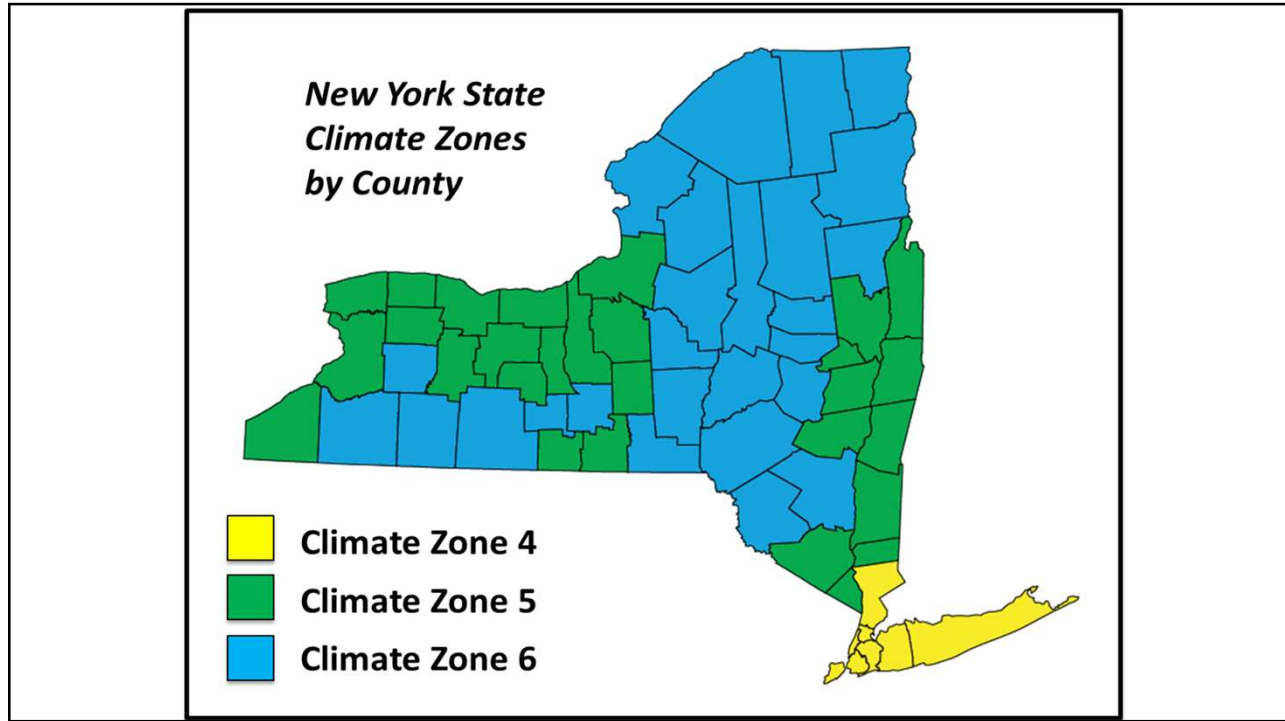
U-Value = 1 ÷ R-Value

U-Value = 1 ÷ 38 = 0.026

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Code Section	Component	CDZ	2020 ECCC NYS	NYStretch	2020 NYC
R402.1	Fenestration U-factor	4A	0.32	0.27	0.27
		5A	0.30	0.27	N/A
		6A	0.3/0.28	0.27	N/A
	Skylights U-factor	4A	0.55	0.5	0.5
		5A	0.55	0.5	N/A
		6A	0.55	0.5	N/A
	Fenestration SHGC	4A	0.4	0.4	0.4
		5A	NR	NR	N/A
		6A	NR/NR	NR	N/A
	Ceiling R Value	4A	49	49	49
		5A	49	49	N/A
		6A	49 / 60	49	N/A
	Wood-framed R-value	4A	20 or 13+5	21 int or 20+5 or 13+10	20+5 or 13+10
		5A	20 or 13+5	21 int or 20+5 or 13+10	N/A
		6A	20+5 or 13+10 / 23 cavity	20+5 or 13+10	N/A

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Code Section	Component	CDZ	2020 ECCC NYS	NYStretch	2020 NYC
R402.1	Mass Walls	4A	8 / 13	15 / 20	15 / 20
		5A	13 / 17	15 / 20	N/A
		6A	15 / 20 - 19 / 21	15 / 20	N/A
	Floor R-value	4A	30 / 30	30	30
		5A	30	30	N/A
		6A	30 / 30	30	N/A
	Basement Wall R-value	4A	10 / 13	15 / 19	15 / 19
		5A	15 or 19	15 / 19	N/A
		6A	15 or 19 / 15 or 19	15 / 19	N/A
	Slab R-value and depth	4A	10, 2 ft	10, 4ft	10, 4ft
		5A	10, 2 ft	10, 4ft	N/A
		6A	10, 4 ft / 10, 4 ft	10, 4ft	N/A
Crawlspace wall R-value	4A	15 / 19	15 / 19	15 / 19	
	5A	15 / 19	15 / 19	N/A	
	6A	15 or 19 / 15 or 19	15 / 19	N/A	

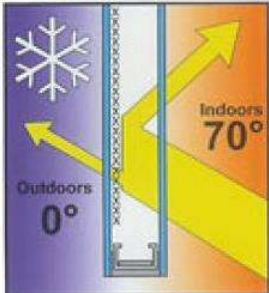
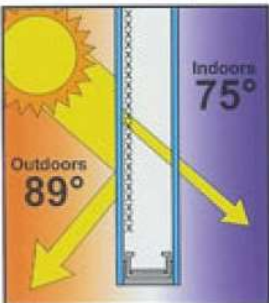
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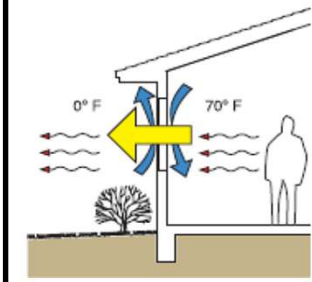
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	Skylights U-factor	4A	0.55	0.5	0.5
		5A	0.55	0.5	N/A
		6A	0.55	0.5	N/A
	Fenestration SHGC	4A	0.4	0.4	0.4
		5A	NR	NR	N/A
		6A	NR	NR	N/A
	Ceiling R Value	4A	49	49	49
		5A	49	49	N/A
		6A	49 / 60	49	N/A
	Wood-framed R-value	4A	20 or 13+5	21 int or 20+5 or 13+10	20+5 or 13+10
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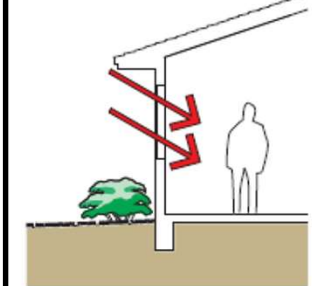
NYStretch Fenestration Requirements





U-Factor
Heat loss of a window assembly is represented by the window's U-Factor (or U-Value). The smaller the U-factor, the less heat loss the window will have due to conduction.



Solar Heat Gain Coefficient (SHGC)
SHGC of a window is a number between 0 and 1 that represents the amount of solar heat gain coming through the glass. The smaller the SHGC, the less heat transmitted through the window.

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NYStretch Fenestration Requirements

ENERGY PERFORMANCE RATINGS

U-Factor (U.S./I-P)	Solar Heat Gain Coefficient
0.27	0.25

ADDITIONAL PERFORMANCE RATINGS

Visible Transmittance	Air Leakage (U.S./I-P)
0.51	< 0.3

U-Factor = 0.27
SHGC = 0.25

Image source: nffc.org

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Code Section	Component	CDZ	2020 ECC NYS	NYStretch	2020 NYC
R402.1	Fenestration U-factor	4A	0.32	0.27	0.27
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		5A	0.55	0.5	N/A
		6A	0.55	0.5	N/A
	Fenestration SHGC	4A	0.4	0.4	0.4
		5A	NR	NR	N/A
		6A	NR/NR	NR	N/A

U-factor	SHGC	VT	Condensation Resistance	Product Description
0.47	0.25	0.59	62	Fiberglass/Fiberglass, Fill 1: ARG/AIR(90/10) , LowE, CL, No Grid
0.42	0.25	0.58	50	Fiberglass/Fiberglass, Fill 1: ARG/AIR(90/10) , LowE, CL, No Grid
0.47	0.25	0.59	60	Fiberglass/Fiberglass, Fill 1: ARG/AIR(90/10) , LowE, CL, No Grid
0.42	0.25	0.57	50	Fiberglass/Fiberglass, Fill 1: ARG/AIR(90/10) , LowE, CL, No Grid
0.47	0.25	0.59	60	Fiberglass/Fiberglass, Fill 1: ARG/AIR(90/10) , LowE, CL, No Grid
0.42	0.25	0.57	50	Fiberglass/Fiberglass, Fill 1: ARG/AIR(90/10) , LowE, CL, No Grid

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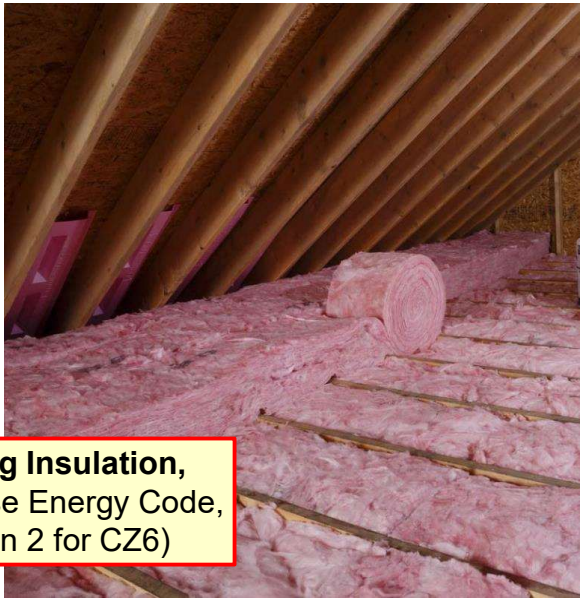
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R402.2.1 NYStretch Ceiling R-Value

[NY] Table R402.1.2
Insulation and Fenestration Requirements by Component

Climate Zone	Ceiling R-value
4	49
5	49
6 Option 1	49
6 Option 2	60

Base code



Since NYStretch requires R-49 for Ceiling Insulation, there is NO difference between the NYS base Energy Code, NYStretch and NYCECC (except no Option 2 for CZ6)

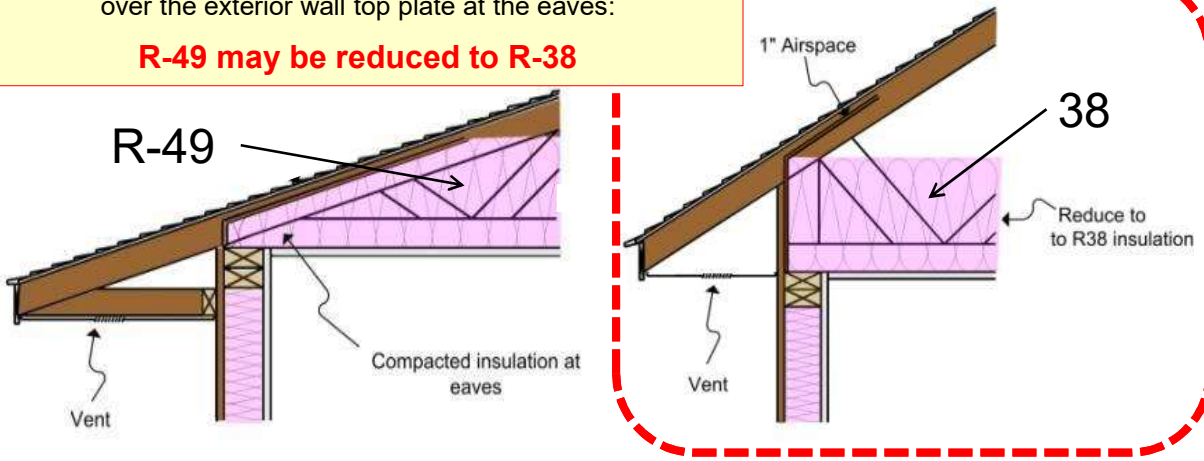
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NYStretch R402.2.1 - Ceilings with Attic Spaces



When 100% of full height of uncompressed insulation extends over the exterior wall top plate at the eaves:

R-49 may be reduced to R-38

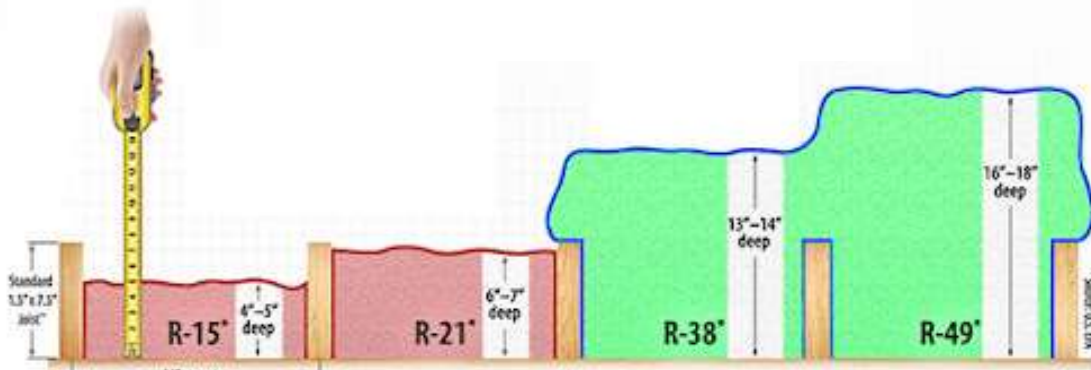


No difference between base Energy Code, NYStretch and NYCECC

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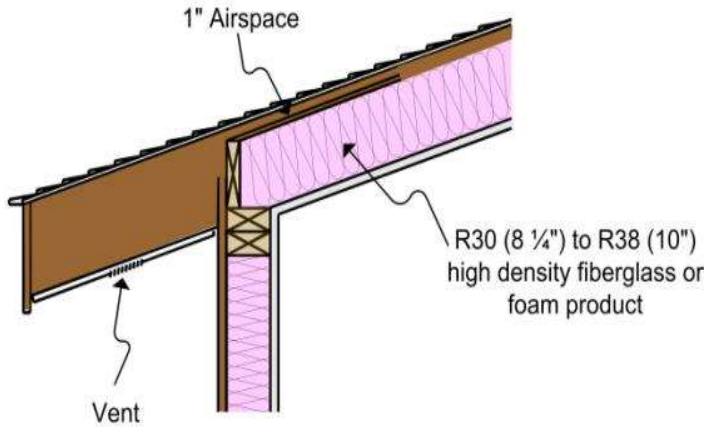
NYStretch Attic Insulation



R-49 insulation in attics can be 16 to 18 inches deep and R-38 insulation can be 12 to 14 inches deep. However, if the insulation is high density fiberglass or closed-cell spray foam, the installed thickness could be slightly less

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NYStretch R402.2.2 - Ceilings *without* Attic Spaces



▪ **NYS BASE CODE:** When the roof/ceiling assembly does not allow sufficient space, R-30 is allowed.

▪ **NYStretch & NYC EC:** Ceiling Without Attics requires R38 (verses R30)

This Ceiling without Attic Space R-Value reduction is limited to 500 SF or 20% of the ceiling area (whichever is less). This area limitation does not apply when using REScheck or a Performance Compliance Path Approach.

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Insulation Types, Thickness and R-Values



Type of Insulation	Thickness	Nominal cavity depth	Labeled R-value	Compressed R-value
Standard batt with 1" airspace	9 1/2"	2x10	R-30	R-28
High-density batt with 1" airspace	8 1/4"	2x10	R-30	N/A
Closed Cell Spray-Foam	7"	2x10	R-42 to R-49	N/A
Standard batt with 1" airspace	12"	2x12	R-38	R-35
High-density batt with 1" airspace	10 1/4"	2x12	R-38	N/A

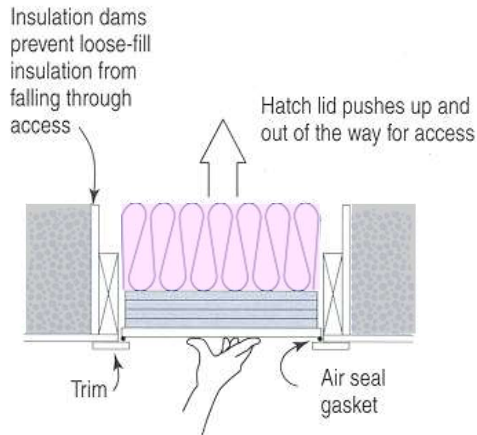


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NYStretch R402.2.4 - Attic Hatches and Doors



SCUTTLE HOLE COVER



Attic hatches and doors:

- ✓ Shall be **weatherstripped**
- ✓ Shall be **insulated** to the same level as the surrounding surface
- ✓ Access to be provided to all equipment that prevents damaging or compressing the insulation
- ✓ Baffle/retainer to prevent loose fill insulation from spilling into living space

No difference between NYS base Energy Code, NYStretch and NYCECC

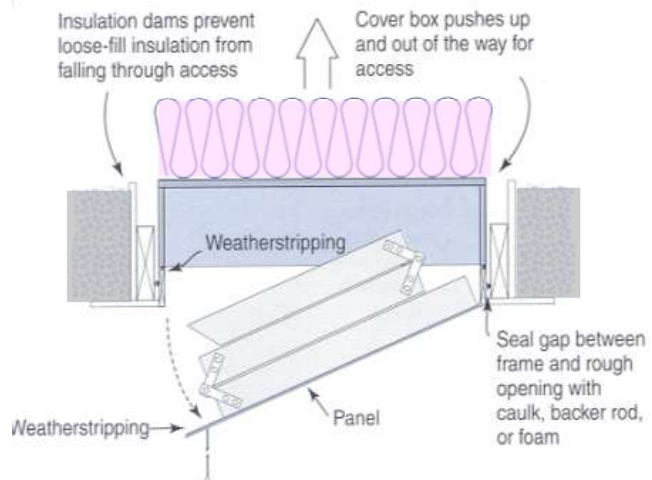
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NYStretch R402.2.4 - Attic Hatches and Doors



Insulating and Air Sealing Pull-down Attic Stairs can be custom built on site or kits can be installed

PULL-DOWN ATTIC STAIRS



No difference between NYS base Energy Code, NYStretch and NYCECC

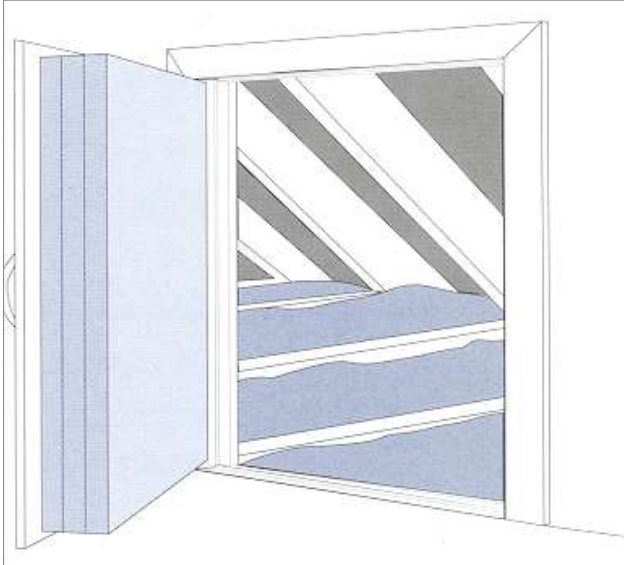
42

NYStretch - Attic Hatches and Doors

- ✓ Vertical doors providing access from conditioned space to unconditioned attics shall comply with *fenestration* U-factor requirements from Table R402.1.2

For NYStretch, the U-Value required is 0.27

- ✓ In addition, knee wall doors to unconditioned attic spaces shall be sealed - Table R402.4.1.1



43

Code Section	Component	CDZ	2020 ECCN NYS	NYStretch	2020 NYC
R402.1	Fenestration U-factor	4A	0.32	0.27	0.27
		5A	0.30	0.27	N/A
		6A	0.3/0.28	0.27	N/A
	Skylights U-factor	4A	0.55	0.5	0.5
		5A	0.55	0.5	N/A
		6A	0.55	0.5	N/A
	Fenestration SHGC	4A	0.4	0.4	0.4
		5A	NR	NR	N/A
		6A	NR/NR	NR	N/A
	Ceiling R Value	4A	49	49	49
		5A	49	49	N/A
		6A	49 / 60	49	N/A
	Wood-framed R-value	4A	20 or 13+5	21 int or 20+5 or 13+10	20+5 or 13+10
		5A	20 or 13+5	21 int or 20+5 or 13+10	N/A
		6A	20+5 or 13+10 / 23 cavity	20+5 or 13+10	N/A

44

NYStretch Exterior Wall Insulation

The diagram shows three cross-sections of exterior wall insulation. Each shows a wall with a red insulation layer, a horizontal line representing a window or door threshold, and a foundation below. The first diagram shows standard framing with insulation between studs. The second shows a cavity with insulation and a continuous layer on the exterior. The third shows a cavity with insulation and a continuous layer on the exterior, with a different framing detail.

Climate Zones 4 & 5
R-21 Insulation with Standard Framing 16" OC

Climate Zones 4, 5 & 6
R-20 Cavity Insulation with R-5 Continuous Insulation

Climate Zones 4, 5 & 6
R-13 Cavity Insulation with R-10 Continuous Insulation

45

NYStretch Insulated Headers

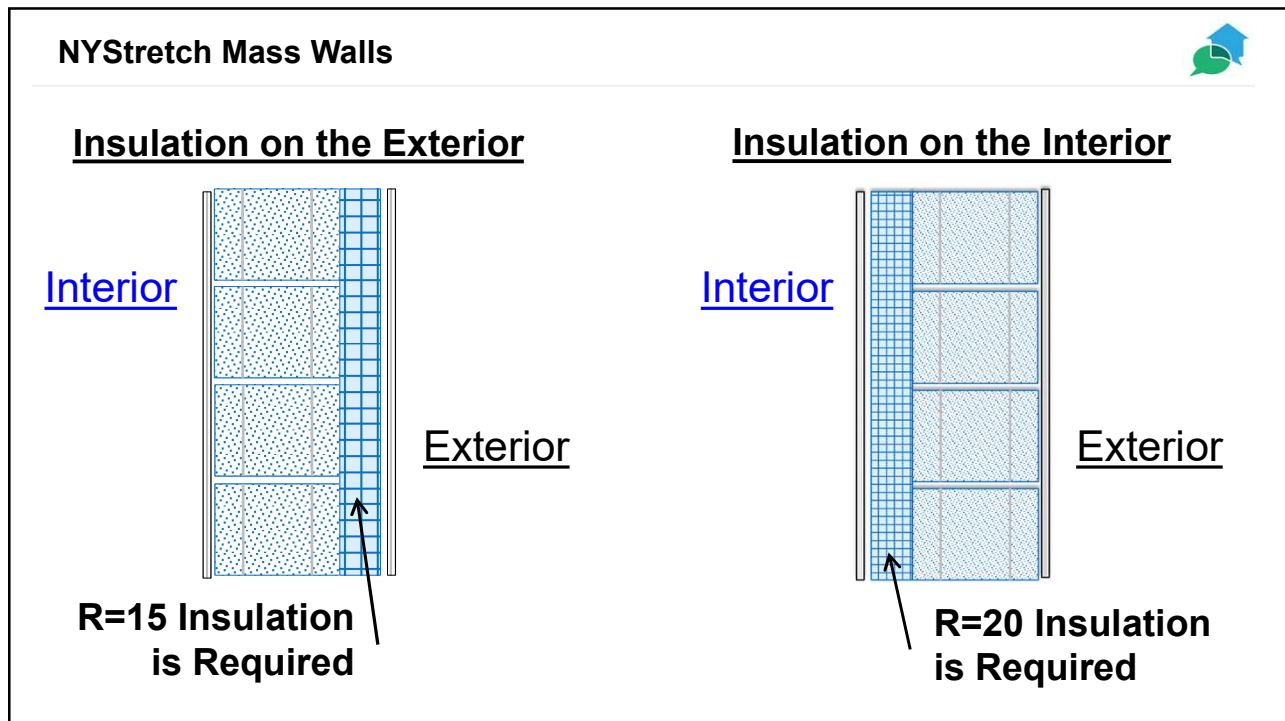
The diagram shows a cross-section of a header with a red insulation layer between two vertical studs. The photograph shows a wooden header in a construction site with a white insulation material applied to its top surface.

Headers shall be insulated with a minimum of R-10 (R-3 per inch minimum for the base Energy Code)

46

Code Section	Component	CDZ	2020 ECCC NYS	NYStretch	2020 NYC	
R402.1	Mass Walls	4A	8 / 13	15 / 20	15 / 20	
		5A	13 / 17	15 / 20	N/A	
		6A	15 / 20 - 19 / 21	15 / 20	N/A	
	Floor R-value	4A	30 / 30	30	30	
		5A	The second R-value applies when more than half the insulation is on the interior of the mass wall.			
		6A				
	Basement Wall R-value	4A				
		5A				
		6A	15 or 19 / 15 or 19	15 / 19	N/A	
	Slab R-value and depth	4A	10, 2 ft	10, 4ft	10, 4ft	
		5A	10, 2 ft	10, 4ft	N/A	
		6A	10, 4 ft / 10, 4 ft	10, 4ft	N/A	
	Crawlspace wall R-value	4A	15 / 19	15 / 19	15 / 19	
		5A	15 / 19	15 / 19	N/A	
		6A	15 or 19	15 / 19	N/A	

47



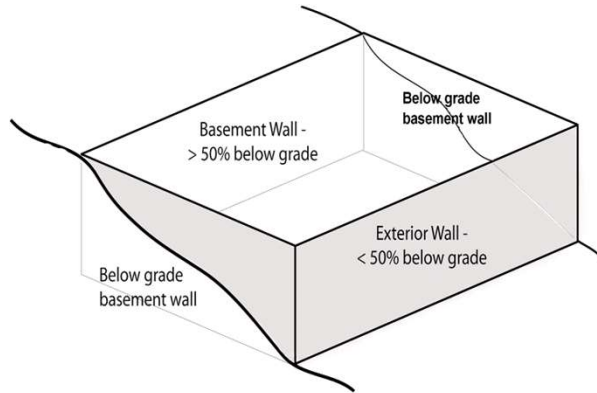
48

Mass Wall vs Basement Wall



Mass Walls can be made of:

- ✓ Concrete block
- ✓ Concrete
- ✓ Insulated concrete forms (ICFs)
- ✓ Masonry cavity
- ✓ Brick (other than brick veneer)
- ✓ Earth (adobe, compressed earth block, rammed earth)
- ✓ Solid timber or solid timber logs



Reminder:

- Mass walls are 50% or more above grade
- Basement walls are less than 50% above grade

49

NYStretch R402.2.5 - Mass Wall Insulation R-Value



**Table 402.1.2
 Mass Wall R-Value**

Climate Zone	NYS Base Code	NYStretch/ NYCECC
4	8/13	15/20
5	13/17	15/20
6 Option 1	15/20	15/20
6 Option 2	19/21	NA

For Climate Zones 4 and 5, NYStretch requires more insulation that the NYS base Energy Code does

50

50

Code Section	Component	CDZ	2020 ECCC NYS	NYStretch	2020 NYC
R402.1	Mass Walls	4A	8 / 13	15 / 20	15 / 20
		5A	13 / 17	15 / 20	N/A
		6A	15 / 20 - 19 / 21	15 / 20	N/A
	Floor R-value	4A	30 / 30	30	30
		5A	30	30	N/A
		6A	30 / 30	30	N/A
	Basement Wall R-value	4A	10 / 13	15 / 19	15 / 19
		5A			N/A
		6A			N/A
	Slab R-value and depth	4A	10, 4ft	10, 4ft	10, 4ft
		5A			N/A
		6A	10, 4ft / 10, 4ft	10, 4ft	N/A
Crawlspace wall R-value	4A	15 / 19	15 / 19	15 / 19	
	5A	15 / 19	15 / 19	N/A	
	6A	15 or 19	15 / 19	N/A	

No change from the base code to NYStretch in the requirements for Floor and Crawlspace Wall R-Values

51


Code Section	Component	CDZ	2020 ECCC NYS	NYStretch	2020 NYC
R402.1	Mass Walls	4A	8 / 13	15 / 20	15 / 20
		5A			N/A
		6A			N/A
	Floor R-value	4A	30 / 30	30	30
		5A			N/A
		6A			N/A
	Basement Wall R-value	4A	10 / 13	15 / 19	15 / 19
		5A	15 or 19	15 / 19	N/A
		6A	15 or 19 / 15 or 19	15 / 19	N/A
	Slab R-value and depth	4A	10, 2 ft	10, 4ft	10, 4ft
5A				N/A	
6A				N/A	
Crawlspace R-value	4A	15 / 19	15 / 19	15 / 19	
	6A	15 or 19	15 / 19	N/A	

NYStretch Code Basement Wall R-Values are the same as the NYS base Energy Code except for Climate Zone 4

R-15 Continuous Insulation (interior or exterior) or R-19 Cavity Insulation (interior) is required.

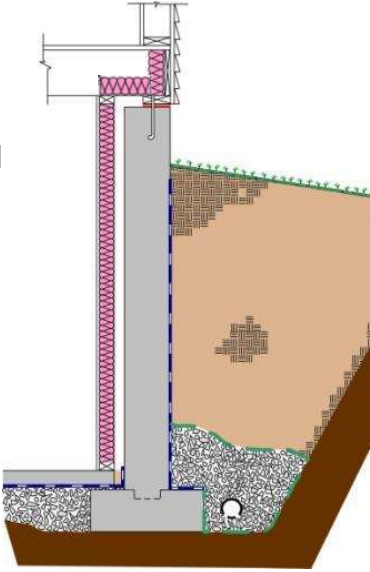
52

NYStretch Basement Wall R-Value



Walls associated with conditioned basements shall be insulated from the top of the basement wall down to:

- 10 feet below grade, or
- To the basement floor (whichever is less)




[NY] Table R402.1.2
 Insulation and Fenestration Requirements by Component

Climate Zone	Basement Wall R-value
4	15/19
5	15/19
6	15/19


R15/19 means R15 continuous or R19 cavity

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Basement Wall Insulation



Remember, basement walls associated with unconditioned basements shall comply with basement wall insulation requirements except where the floor above the basement is insulated in accordance with Sections R402.1.2 and R402.2.8



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Code Section	Component	CDZ	2020 ECCC NYS	NYStretch	2020 NYC
R402.1	Mass Wall				5 / 20
					N/A
					N/A
	Floor R-value	5A	30	30	30
	Basement R-value				N/A
	Slab-on-Grade R-value & depth	4A	10, 2 ft	10, 4ft	10, 4ft
		5A	10, 2 ft	10, 4ft	N/A
		6A	10, 4 ft / 10, 4 ft	10, 4ft	N/A
Crawlspace wall R-value	4A	15 / 19	15 / 19	15 / 19	
	5A	15 / 19	15 / 19	N/A	
	6A	15 or 19	15 / 19	N/A	

No change from the base code to NYStretch in the requirements for Slab-on-Grade R-Value

However, NYStretch requires insulation to extend from the top of the slab downward to grade and then 48" by any combination of vertical insulation, insulation extending under the slab or insulation extending out from the building

55

NYStretch Concrete Slab-on-Grade R-Value

- ✓ Slab-on-grade floors with a floor surface less than 12 inches below grade shall be insulated with minimum of R-10.
- ✓ The insulation shall extend downward from **the top of the slab** on the outside or inside of the foundation wall.
- ✓ Exceptions for jurisdictions designated by the building official to have very heavy termite infestations.

Climate Zone	Slab R-value
4	10, 4 ft
5	10, 4 ft
6	10, 4 ft

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NYStretch Concrete Slab-on-Grade Insulation Depth

A + B ≥ 48"

Insulation located below grade shall be extended 48 inches by any combination of:

- 1) vertical insulation
- 2) insulation extending under the slab, or
- 3) insulation extending out from the building

57

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2"

Two inches of XPS = R-10

58

Not All Insulation Board is the Same



EPS insulation is typically about R-4 per inch

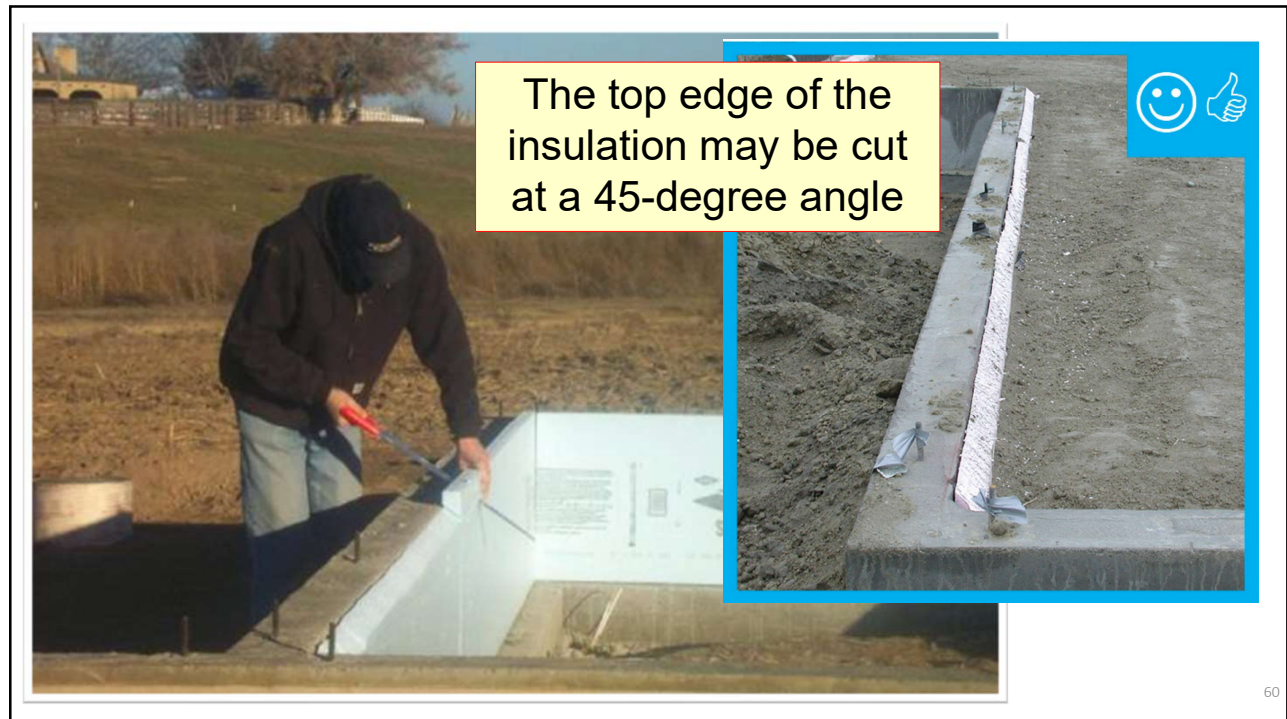
Expanded polystyrene or EPS Insulation Board is usually white in color and is made by fusing small beads of foam together into a sheet.



XPS insulation is typically about R-5 per inch

Extruded polystyrene or XPS Insulation Board is usually blue or pink in color and is made by extruding foam together into a sheet.

59



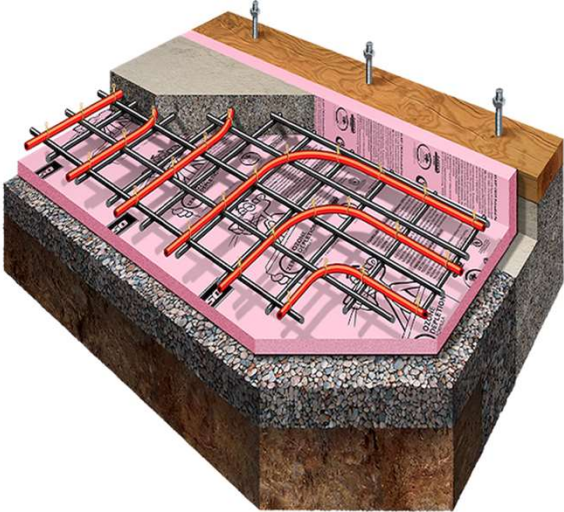
The top edge of the insulation may be cut at a 45-degree angle



60

60

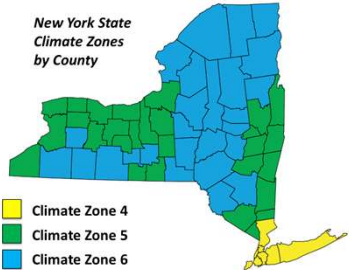
NYStretch Heated Slab-on-Grade Insulation Depth



For heated slab-on-grade floors, R-10 continuous insulation shall be provided from the top of the slab to the bottom of the slab and then completely under the full slab area of a heated slab.

For the base Energy Code, R-5 is required UNDER the slab.

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New York State Climate Zones by County

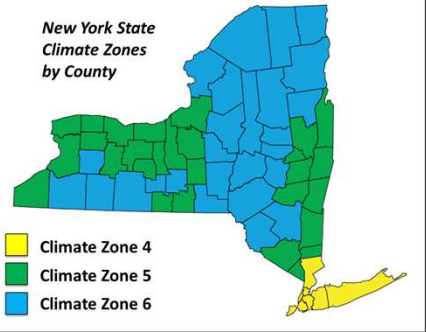
- Climate Zone 4
- Climate Zone 5
- Climate Zone 6

[NY] Table 402.1.2
Climate Zone 4
 Insulation and Fenestration Requirements by Component

Energy Code	Fenestration U-Factor	Skylight U-Factor	Glazed Fenestration SHGC	Ceiling R-value	Wood Frame Wall R-value	Mass Wall R-value	Floor R-value	Basement Wall R-value	Slab R-value & depth	Crawl Space ^c Wall R-value
NYS Base Code	0.32	0.55	0.40	49	20 or 13 + 5 ^h	8/13	19	10/13	10, 2ft	10/13
NY Stretch	0.27	0.50	0.40	49	21 or 20 + 5 13 + 10	15/20	30	15/19	10, 4ft	15/19
NYC	0.27	0.50	0.40	49	20 + 5 13 + 10	15/20	30	15/19	10, 4ft	15/19

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New York State Climate Zones by County



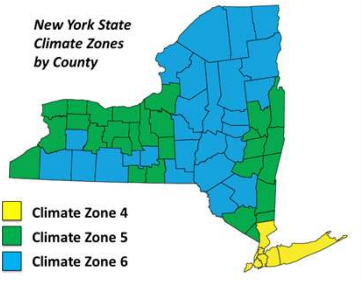
**[NY] Table 402.1.2
Climate Zone 5
Insulation and Fenestration Requirements
by Component**

Energy Code	Fenestration U-Factor	Skylight U-Factor	Glazed Fenestration SHGC	Ceiling R-value	Wood Frame Wall R-value	Mass Wall R-value	Floor R-value	Basement Wall R-value	Slab R-value & depth	Crawl Space ^c Wall R-value
NYS Base Code	0.30	0.55	NR	49	20 or 13 + 5 ^h	13/17	30	15/19	10, 2 ft	15/19
NY Stretch	0.27	0.50	NR	49	21 or 20 + 5 13 + 10	15/20	30	15/19	10, 4ft	15/19

63

63

New York State Climate Zones by County

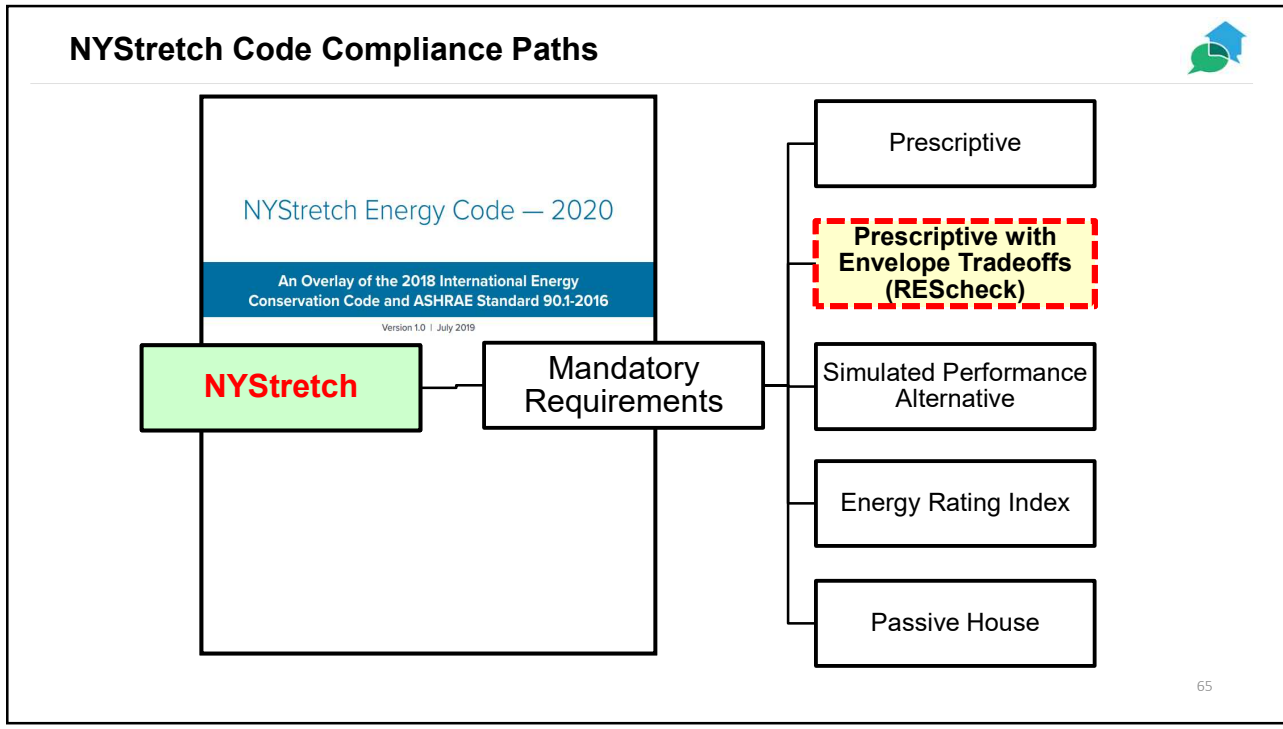


**[NY] Table 402.1.2
Climate Zone 6
Insulation and Fenestration Requirements by Component**

Energy Code	Fenestration U-Factor	Skylight U-Factor	Glazed Fenestration SHGC	Ceiling R-value	Wood Frame Wall R-value	Mass Wall R-value	Floor R-value	Basement Wall R-value	Slab R-value & depth	Crawl Space ^c Wall R-value
NYS EC Option 1	0.30	0.55	NR	49	20 + 5 or 13 + 10	15/20	30	15/19	10, 4 ft	15/19
NYS EC Option 2	0.28	0.55	NR	60	23 Cavity	19/21	30	15/19	10, 4 ft	15/19
NY Stretch	0.27	0.50	NR	49	20 + 5 13 + 10	15/20	30	15/19	10, 4ft	15/19

64

64



65

Total UA Alternative - REScheck

Total UA Alternative - REScheck

REScheck allows “trade-offs” between building envelope components of the house (ceiling, walls, windows, doors, foundation, etc.)
 Choose “2020 NYSTRETCH - 2018 IECC” in drop down menu for NYS envelope compliance.

<http://www.energycodes.gov/rescheck>

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Total UA Alternative - REScheck

Generated by REScheck-Web Software Compliance Certificate

Project: A Sample Project

Energy Code: 2018 IECC
 Location: Albany, New York
 Construction Type: Single-family
 Project Type: New Construction
 Orientation: Bldg. faces 180 deg. from North
 Conditioned Floor Area: 3,000 ft2
 Glazing Area: 2%

Climate Zone: 5 (6894 HDD)
 Permit Date: 2020-05-11T04:00:00.000Z
 Permit Number:

Construction Site: 123 Main St., Albany, NY 12210
 Owner/Agent:
 Designer/Contractor: Acme Home Designers

Compliance: Passes using UA trade-off
 Compliance: 15.2% Better Than Code Maximum UA: 553 Total UA: 469

Envelope Assemblies

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	U-Factor	UA
my Ceiling: Flat Ceiling or Scissor Truss	3,000	41.0	0.0	0.029	86
my Skylight: Metal Frame				0.500	10
Wall 1: Wood Frame, 24" Orientation: Front			5.0	0.042	49
Door 1: Solid Door (under Orientation: Front				0.700	22
Wall 2: Wood Frame, 24" Orientation: Front			5.0	0.042	48
Window 1: Metal Frame Orientation: Front				0.250	4
Window 2: Metal Frame Orientation: Front				0.250	4
Window 3: Metal Frame Orientation: Front	16			0.250	4
Wall 3: Wood Frame, 24" o.c. Orientation: Front	1,200	21.0	5.0	0.042	50
Window 3: Metal Frame Orientation: Front	16			0.250	4
Wall 4: Wood Frame, 24" o.c. Orientation: Front	1,200	21.0	5.0	0.042	50
Window 4: Metal Frame Orientation: Front	16			0.250	4
Floor 1: All-Wood joist/Truss	3,000	35.0	0.0	0.028	84

Project Title: A Sample Project
 Data Filename:

REScheck provides Compliance Certificates, Field Inspection Checklists and more...

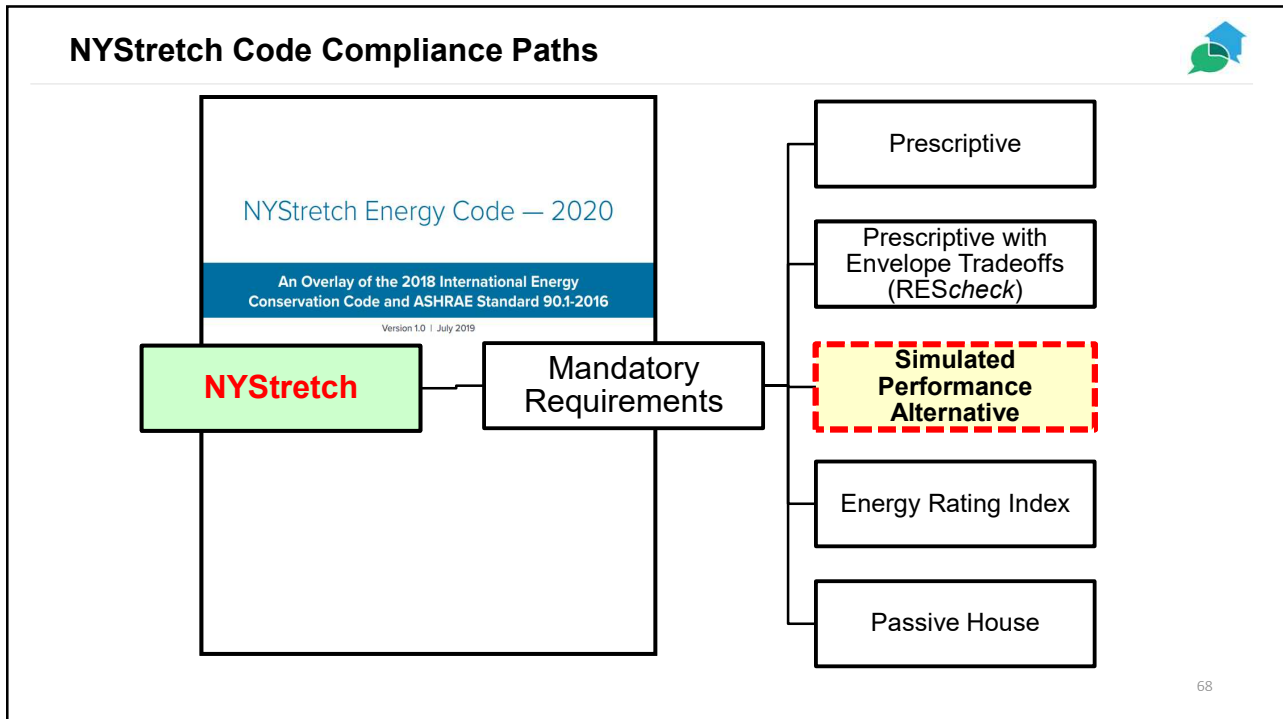
This design "Passes" 2018 IECC Envelope Compliance

This design "Fails" 2018 IECC Envelope Compliance

Make sure to use the web version of REScheck!

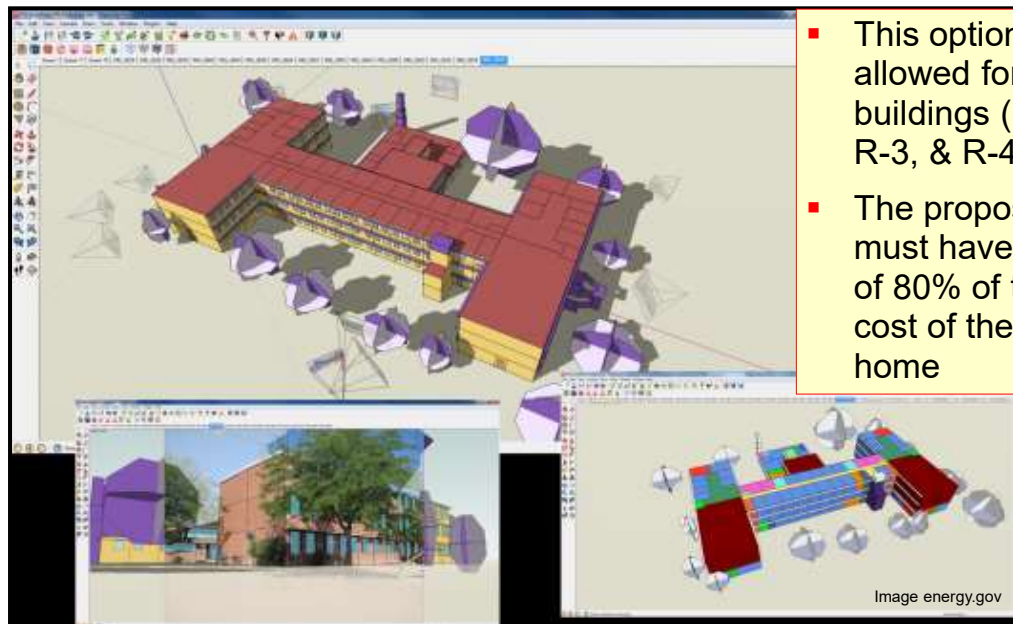
<http://www.energycodes.gov/rescheck>

67



68

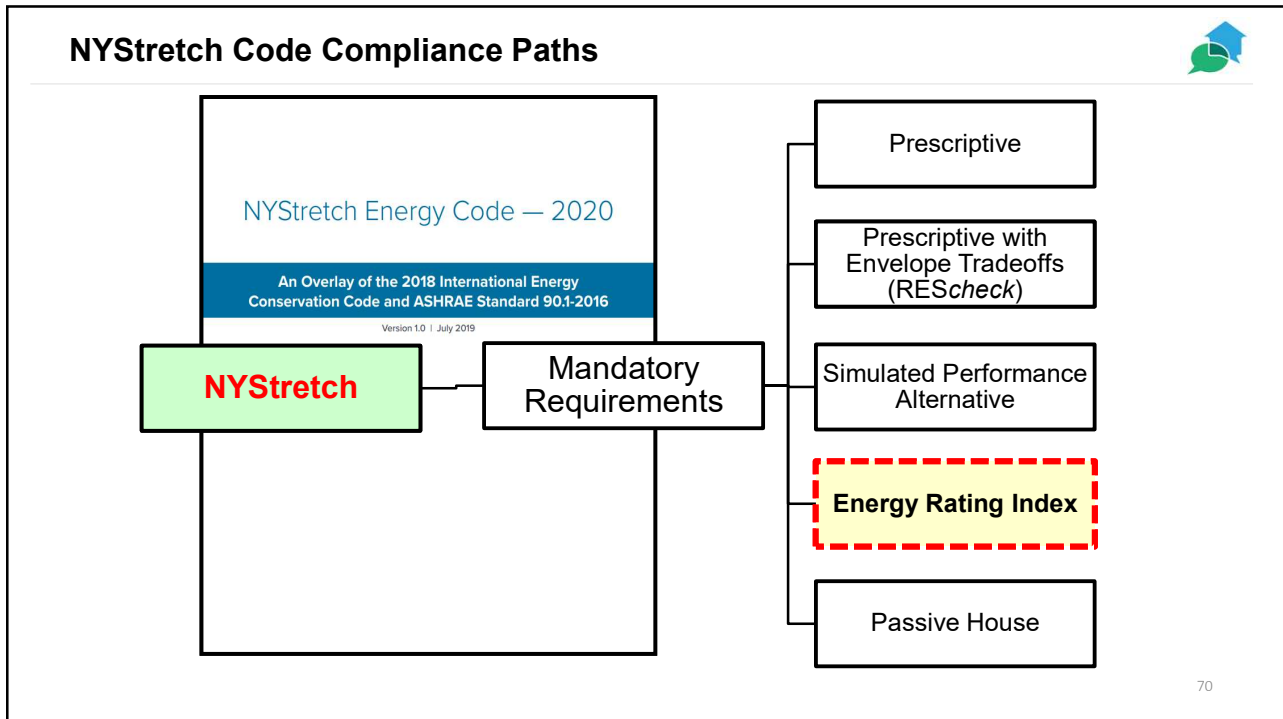
NYStretch - Simulated Performance Alternative



- This option is only allowed for multifamily buildings (Groups R-2, R-3, & R-4)
- The proposed home must have a maximum of 80% of the energy cost of the reference home

Image energy.gov

69



70

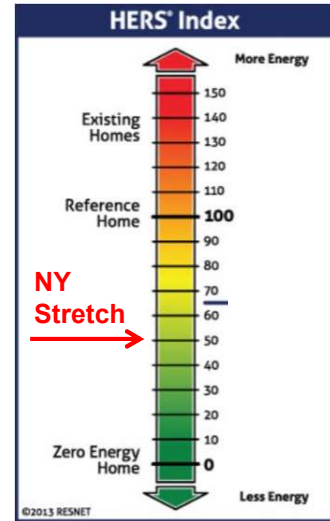
ERI-based Compliance R406

- Compliance based on an ERI analysis requires that the rated design be shown to have an ERI less than or equal to the appropriate value listed in Table R406.4
- Section R406.5 requires that verification of compliance with Section R406 be completed by an approved third party

[NY] Table R406.4
Maximum Energy Rating Index

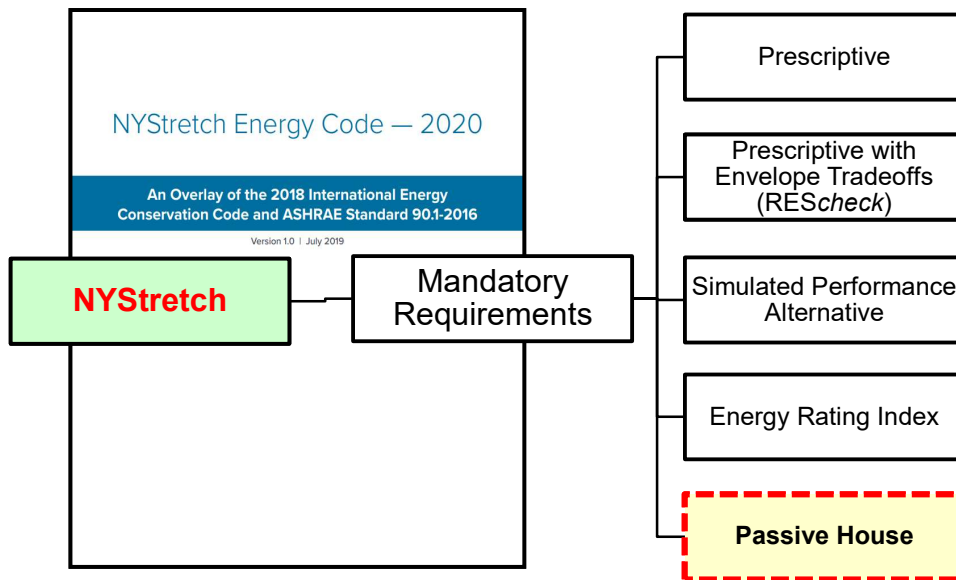
Climate Zone	ERI Base Code	ERI NYStretch /NYCECC
4	62	50
5	61	50
6	61	50

A home with a HERS Index Score of 50 is 50% more energy efficient than the Reference Home



Source: <http://www.resnet.us/energy-rating>

NYStretch Code Compliance Paths



R408 Passive House Based Compliance Option

- The Passive House compliance option is only offered in the NYStretch Code (it is not an eligible compliance option in the NYS base Energy Code or in NYC)
- ALL base “Prescriptive” and “Mandatory” Energy Code Requirements shall be met
- Passive House fundamental principals include:
 - Solar Orientation
 - High R-Value Insulation
 - High-Performance Windows
 - Air-Tight Building Envelope
 - Balanced Mechanical Ventilation with Heat Recovery

73

73

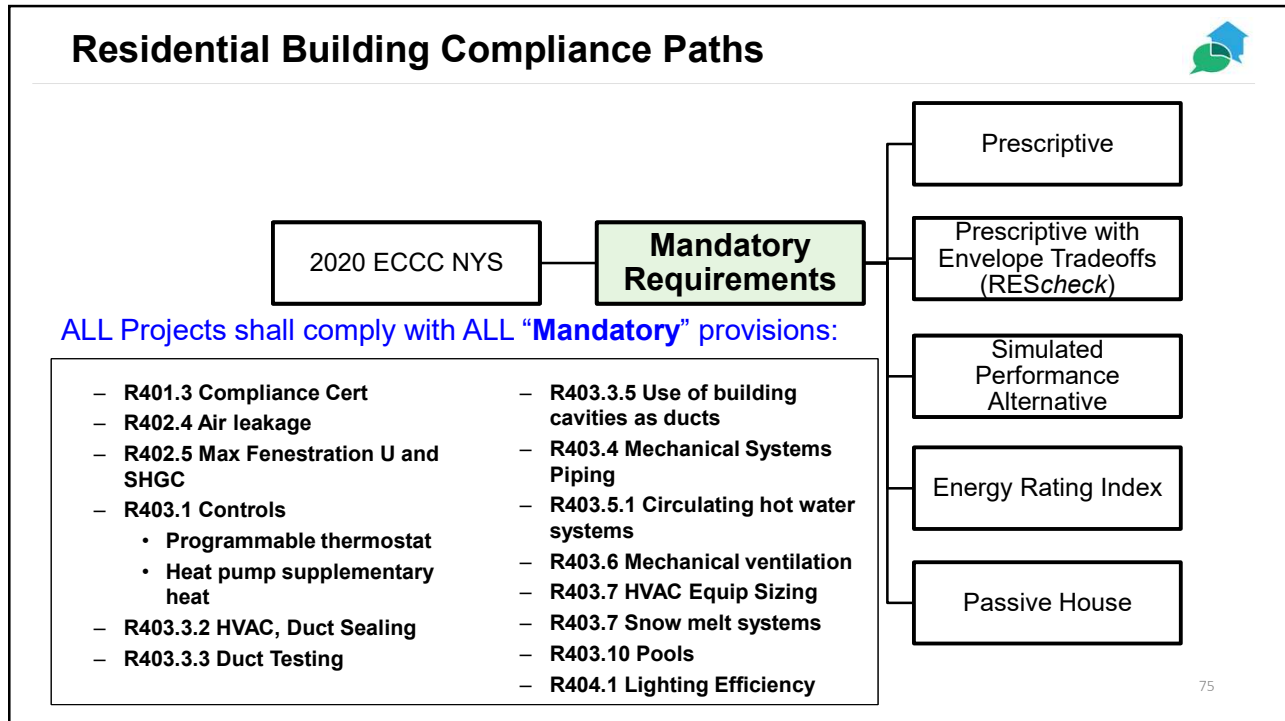
NYStretch Code Mandatory Requirements

```

    graph TD
      A["NYStretch Energy Code – 2020  
An Overlay of the 2018 International Energy Conservation Code and ASHRAE Standard 90.1-2016  
Version 1.0 | July 2019"] --- B["NYStretch Mandatory Requirements Mirror the NYS Base Energy Code"]
      B --- C["Mandatory Requirements"]
      C --- D["Prescriptive"]
      C --- E["Prescriptive with Envelope Tradeoffs (REScheck)"]
      C --- F["Simulated Performance Alternative"]
      C --- G["Energy Rating Index"]
      C --- H["Passive House"]
      I["NYStretch"] --- B
  
```

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POLL #3

True or False

NYStretch code has Mandatory Requirements and several compliance path options.

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R402.4 Air Leakage (Mandatory)



Table R402.4.1.1
 Air Barrier and Insulation Installation Criteria

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/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 of R-3 per inch minimum. 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 window/door jambs and framing, and skylights and framing shall be sealed.	

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R402.4 Air Leakage (Mandatory)



Table R402.4.1.1
 Air Barrier and Insulation Installation Criteria (Continued)

Rim joists	Rim joists shall include the air barrier.	Rim joists shall be insulated.
Floors (including above garage and cantilevered floors)	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, or floor framing cavity insulation shall be permitted to be in contact with the top side of sheathing, or continuous insulation installed on the underside of floor framing and extends 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.	Where provided instead of floor insulation, insulation shall be permanently attached to the crawlspace walls.
Shafts, penetrations	Duct shafts, utility penetrations, and flue shafts opening to exterior or unconditioned space shall be sealed.	
Narrow cavities		Batts in narrow cavities shall be cut to fit, or narrow cavities shall be filled by insulation that on installation readily conforms to the available cavity space.
Garage separation	Air sealing shall be provided between the garage and conditioned spaces.	

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R402.4 Air Leakage (Mandatory)



Table R402.4.1.1
 Air Barrier and Insulation Installation Criteria (Continued)

Recessed lighting	Recessed light fixtures installed in the building thermal envelope shall be sealed to the drywall.	Recessed light fixtures installed in the building thermal envelope shall be air tight and IC rated.
Plumbing and wiring		Batt insulation shall be cut neatly to fit around wiring and plumbing in exterior walls, or insulation that on installation readily conforms to available space shall extend behind piping and wiring.
Shower/tub on exterior wall	The air barrier installed at exterior walls adjacent to showers and tubs shall separate them from the showers and tubs.	Exterior walls adjacent to showers and tubs shall be insulated.
Electrical/phone box on exterior walls	The air barrier shall be installed behind electrical or communication boxes or air-sealed boxes shall be installed.	
HVAC register boots	HVAC register boots that penetrate building thermal envelope shall be sealed to the subfloor or drywall.	
Concealed sprinklers	When 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.	

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NYStretch Amendments to Section R402.4.1.1 Installation (Mandatory)



- ✓ An approved agency shall inspect all components and verify compliance of all components included in Table R402.4.1.1
- ✓ The inspection shall include an open wall visual inspection of all components included in Table R402.4.1.1
- ✓ Insulation shall be installed so that the insulation material uniformly fills each cavity side-to-side and top-to-bottom, without substantial gaps or voids around obstructions, and is split, installed, or fitted tightly around wiring and other penetrations in the cavity



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NYStretch Approved Agency or Third Party



- **NYStretch:** “An approved agency shall inspect all components and verify compliance of all components included in Table R402.4.1.1”
- **NYSECC:** “Where required by the building official, testing shall be conducted by an approved third party”
- **ERI R406:** “Verification of compliance with Section R406 shall be completed by an approved third party”
- **Passive House:** “...as modeled and field-verified by a Certified Passive House Consultant”



- HERS Rater
- HERS Rating Field Inspector



- Duct and Envelope Testing (DET) Verification Technician



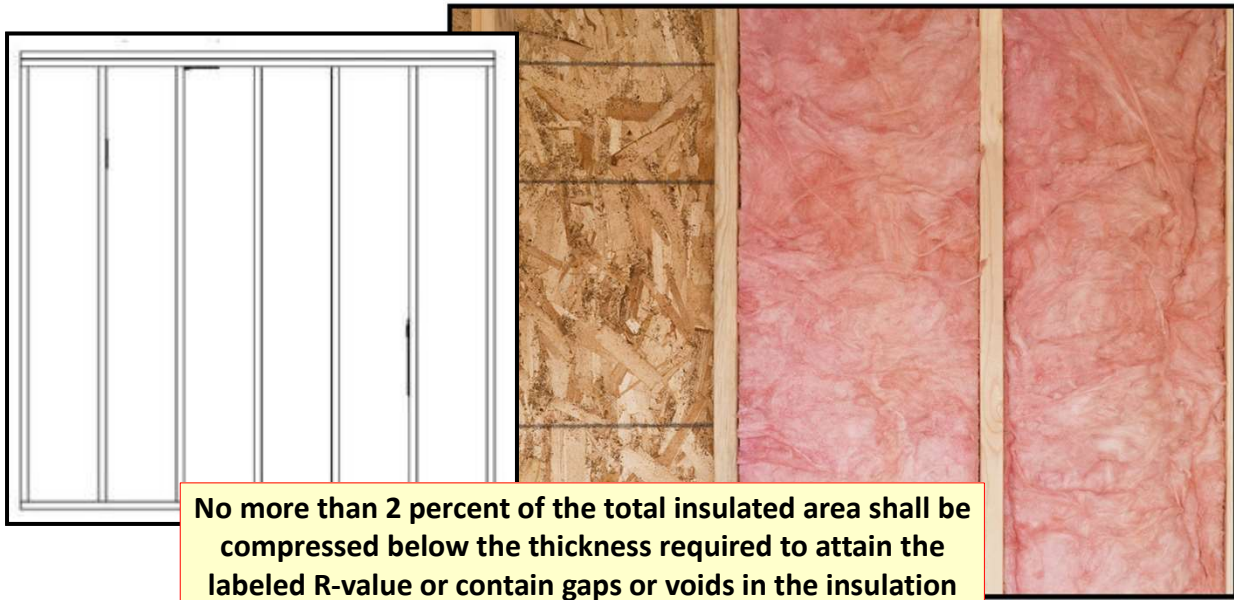
- BPI Building Analyst (BA)
- BPI Envelope Professional (EP)
- BPI Infiltration & Duct Leakage (IDL)



- Certified Passive House Consultant

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NYStretch Insulation Installation Quality



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NYStretch - Air Leakage Testing (Mandatory)



Blower Door Test

Building Air-tightness Testing:

- The building or dwelling unit shall be tested and verified as having an **air leakage rate not exceeding 3 air changes per hour at a pressure of 50 Pascals.**
- Where required by the code official, testing shall be conducted by an approved third party (such as BPI or RESNET certified individuals).
- Air Leakage requirements for NYStretch are unchanged from the base NYS Energy Code except for the Passive House Compliance Path

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NYStretch - Air Leakage Testing (Mandatory)



Blower Door Test

Blower Door Test Example:

- The building or dwelling unit is 2,000 square feet in conditioned floor area and 16,000 cubic feet in conditioned volume and the Blower Door Test result was 750 CFM₅₀.

$$ACH_{50} \text{ (Actual)} = CFM_{50} \times 60 / \text{Cond Vol}$$

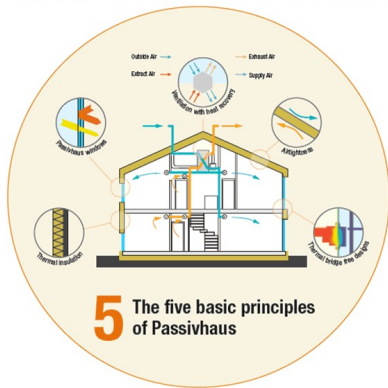
$$ACH_{50} = 750 \times 60 / 16,000 = 2.81$$

(since the blower door test was less than or equal to 3 air changes per hour at a test pressure of 50 pascals, this complies with the Energy Code)

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84

Passive House Air Leakage Requirement



5 The five basic principles of Passivhaus

The building or dwelling unit shall be tested and verified as having an air leakage rate not exceeding 1 air changes per hour at a pressure of 50 Pascals

Blower Door Test Example:

- The building or dwelling unit is 2,000 square feet in conditioned floor area and 16,000 cubic feet in conditioned volume and the Blower Door Test result was 750 CFM₅₀.

$$ACH_{50} \text{ (Actual)} = CFM_{50} \times 60 / \text{Cond Vol}$$

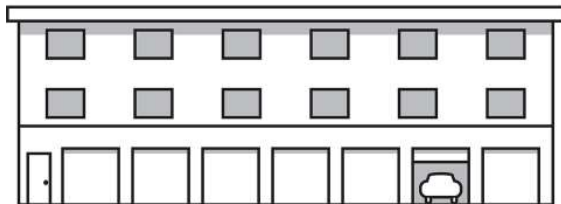
$$ACH_{50} = 750 \times 60 / 16,000 = 2.81$$

(since the blower door test was more than 1 air changes per hour at a test pressure of 50 pascals, this does not comply with the Passive House Requirements)

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NYStretch - Optional Air Leakage Testing for Multi-Family (Mandatory)



2 or More Dwelling Units

- For Buildings with 2 or more dwelling units, an alternative testing procedure shall allow for an air leakage rate not exceeding: **.3 CFM per sf of surface area**
- Also, for buildings with more than 7 dwelling units, air leakage testing can be grouped into sample sets of representative units.

For more information on Air Sealing Homes and Blower Door Testing, see the training on "Residential Air Sealing to 3 ACH50"

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POLL #4



True or False

NYStretch has the same air leakage requirements in the prescriptive path as the base Energy Code.

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NYStretch - Information On Construction Documents



Details shall include:

- ✓ Insulation materials and R-values
- ✓ Fenestration U-factors and SHGC's
- ✓ Area-weighted U-factor and SHGC calculations (if applicable)
- ✓ Mechanical system design criteria
- ✓ Mechanical and service water-heating systems and equipment types, sizes and efficiencies
- ✓ Equipment and system controls
- ✓ Duct sealing, duct and pipe insulation and location
- ✓ Air sealing details

**No Change from NYS
Base Energy Code**

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NYStretch - Information On Construction Documents

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R105.2.1 Building Thermal Envelope Depiction

Section 105.2.1 requires the *building's thermal envelope* shall be represented on the construction drawings

Building Thermal Envelope

No Change from NYS Base Energy Code

Courtesy of the Department of Energy's Building America Solution Center (<http://basc.energy.gov>)

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R105.2.2 Written Statement

Section 105.2.2 of the NYSECCC requires that when the plans or specifications bear the seal and signature of a registered design professional...

such registered design professional shall also include a written statement that to the best of his or her knowledge, belief and professional judgment, such plans or specifications are in compliance with the Energy Code

No Change from NYS Base Energy Code

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Duct and Envelope Testing (DET) Form



RESIDENTIAL DUCT & ENVELOPE TESTING (DET) FORM

House Address: 123 ABC Lane Permit #: 12345 Date: _____
Permit holder: John Smith Phone: 518-555-5555

I Building Envelope Air Leakage (mandatory):

Blower door test (Mandatory)

Test Result:
Fan Flow at 50 Pascals = 780 CFM50 Total Conditioned Volume = 16,000 ft³
ACH50 = CFM50 x 60 / Volume = 2.7 ACH50*

Testing company: Best Blower Door Testing Company Phone: 800-555-5555
Tester Name (print): John Best Signature: John Best Date: 12-12-2021
BPI or HERS certification number: BPI no: _____ HERS Rater no: _____ HERS RFI no: _____

*For Simulated Performance Alternative and Energy Rating Index Paths, value must match 2015 IECC Energy Cost Report or 2015 Final ERI Report

Blower Door Test

- Test result is ≤ 3.0 ACH50
- Signed by individual performing the test
- The test shall be performed by an approved third party


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Adopting NYStretch in your Local Area

The 2020 Adoption Resources NYStretch “Toolkit” includes:

- ✓ An Adoption Guide
- ✓ A General NYStretch Fact Sheet
- ✓ A Comparison Document (compares the NYStretch-2020 to the 2020 Energy Conservation Construction Code of New York State (State Energy Code).
- ✓ A Commercial Cost Analysis Report
- ✓ A Residential Cost Analysis Report
- ✓ A Stringency Analysis Summary (suitable as an Exhibit when filing with the Department of State)
- ✓ FAQ document on NYStretch.



If you have further questions, contact the NYSERDA codes team - codes@nyserda.ny.gov

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NYStretch and 2020 New York City Energy Conservation Code Highlights

*Part 2
of the New York
Residential Stretch
Code Training*

Mechanical systems:

- All ducts in conditioned space
- Ducts sized properly
- Efficient plumbing layouts
- Drain water heat recovery
- Recirculation systems
- Balanced ventilation with HRV/ERV or HVAC-integrated with ECM
- Ventilation flow testing required

Electric Power & Lighting:

- Lighting – basically requires LEDs
- Electric power packages
 - Solar-ready zone
 - EV equipment capable

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Thank You & Questions

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NYDOS Course Number:

T02-07-2977

<https://psdconsulting.com/ny-energycode/>

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