



NYSERDA

2020 ECCCNY S for Residential: Introduction Minimum Requirements for Energy Efficient Buildings

**Matt Evans, Building Consultant and HERS Rater
Newport Ventures**



Who are we?

Newport Ventures

- Consulting/ Energy Code Training
- High performance buildings
- ENERGY STAR ratings
- Performance testing

NYS DOS

- Code administration
- Technical assistance
- Code interpretation
- Code training, CEUs



Course Objectives



Understand differences from 2016 ECCCNY and commonly misunderstood provisions



Understand the MANDATORY requirements for residential buildings



Understand compliance options for residential buildings



Understand what information must be provided (Design Professional and Builder) and what to look for (CEO)

Residential Provisions

- Chapter 1- Scope and Administration
- Chapter 2- Definitions
- Chapter 3- General Requirements
- Chapter 4- Residential Energy Efficiency
- Chapter 5- Existing Buildings



Chapter 1 – Scope and Administration

No major changes in Chapter 1

- New Sections and Exceptions have been added to Chapter 1. Wording where underlined has been added.
- Minor wording modifications as well

What to Remember

- Procedure for code interpretations by Secretary of State.
- Building thermal envelope must be shown on the plans.
- Where a building contains both residential and commercial portions, each portion shall meet the respective section of the ECCCNY

Chapter 2 – Definitions

Residential Buildings

- Detached one- and two family dwellings not more than 3 stories above grade
- Three or more attached townhouse units not more than 3 stories above grade
- R-2, R-3, and R-4 buildings not more than 3 stories above grade
- Mobile homes

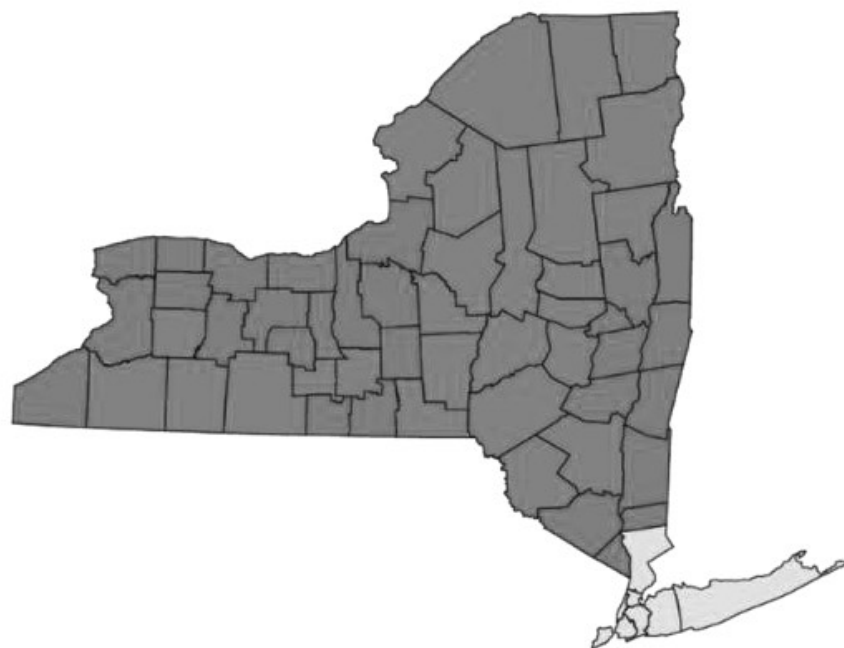


Mobile Homes are those existing and constructed prior to June 15, 1976 .
 Manufactured homes constructed subsequent to this date are not regulated by the ECCCNY.

-Reference: 2020RCNYS Appendix E



Chapter 3- General Requirements



Climate Zones

Mandatory Requirements

Prescriptive Requirements

Compliance Paths

COMPLIANCE OPTIONS FOR RESIDENTIAL BUILDINGS

Chapter 4: Compliance Options

Prescriptive Path

- R402.1.3
R-Value Computation
- R402.1.4
U-factor Alternative
- R402.1.5
Total UA Alternative

Performance Path

- R405
Simulated Performance
Alternative
- R406
Energy Rating Index
Compliance Alternative

Beyond the Building Envelope

- Section R403
 - Programmable T-Stats
 - Ductwork
 - Duct Testing
 - Hot Water
 - Pipe Insulation
- Section R404
 - Lighting



Why have different options for compliance?

Flexibility

Builder
Preference

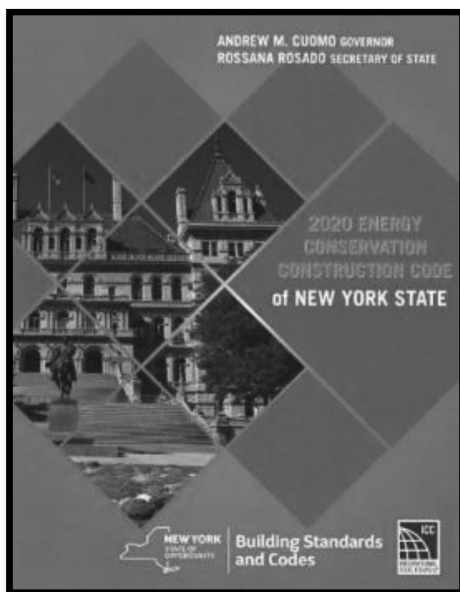
Unique
Homes

Durability

Cost
Savings

Customer
Preference

Energy
Savings



“The code is not intended to prevent the use of any material, method of construction, design or insulating system not specifically prescribed herein, provided that such construction, design or insulating system has been approved by the code official as meeting the intent of the code.”

Prescriptive Compliance Path (R402, R403 R404)

“Tell me what to do and I’ll do it”

Residential and Commercial

R-Values or U-Factors

Most straightforward

Least flexibility

Quick, easy and to the point!



The R-value Method....

Table R402.1.2 Insulation and Fenestration Requirements by Component

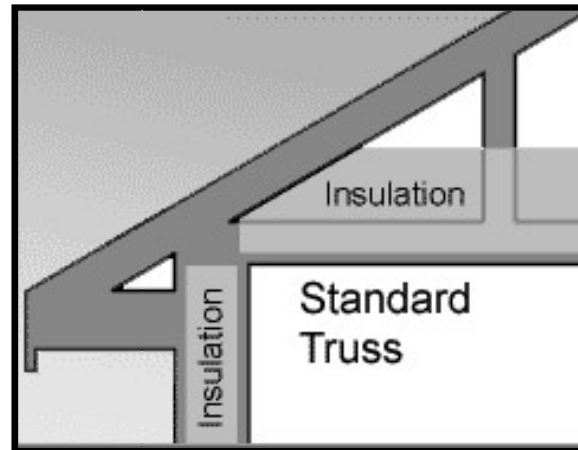
2020 ECCCNYS	FENESTRA TION U- FACTOR ^b	SKYLIGHT ^b U- FACTOR	GLAZED FENESTRA TION SHGC ^{b, e}	CEILING R- VALUE	WOOD FRAME WALL R- VALUE	MASS WALL R-VALUE ⁱ	FLOOR R-VALUE	BASEMEN T ^e WALL R-VALUE	SLAB ^d R-VALUE & DEPTH	CRAWL SPACE ^c WALL R- VALUE
4	0.32	0.55	.40	49	20 or 13+5	8/13	19	10/13	10, 2 ft	10/13
5	0.30	0.55	NR	49	20 or 13+5	13/17	30	15/19	10, 2 ft	15/19
6 Option 1	0.30	0.55	NR	49	20 + 5 or 13 + 10	15/20	30	15/19	10, 4 ft	15/19
6 Option 2	0.28	0.55	NR	60	23 Cavity	15/20	30	15/19	10, 4ft	15/19

Specific Insulation Requirements

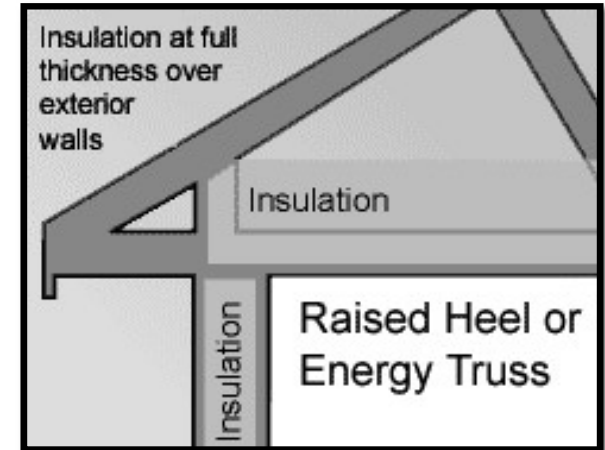
Insulation Flexibility Using Raised-heel Trusses – R402.2.1

* Does not apply to U-Factor Alternative or Option 2 in CZ 6

R-49



R-38



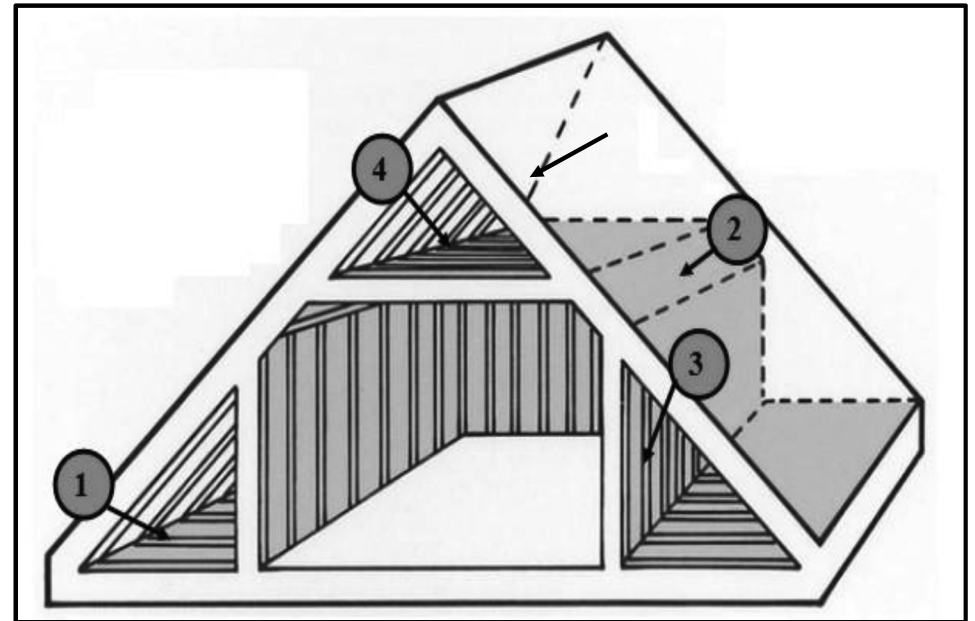
Specific Insulation Requirements

Cathedral Ceilings

- *Minimum of R-30 required*
- *Max: 500 sf or 20% of insulated roof area, whichever is less*
- *Extend over exterior wall uncompressed*
- *Does not apply to U-Factor Alternative or Option 2 in CZ 6*



Specific Insulation Requirements



Documenting Compliance

Declaration of path chosen

All applicable values from Table R402.1.2

Details and descriptions of how mandatory items will be met

1. Air barrier and Insulation details per table R402.4.1.1
2. System control requirements of R403.1
3. Duct sealing per R403.3.2 and testing if applicable per R403.3.3
4. Mechanical System piping insulation per R403.4
5. Service hot water system compliance per R403.5
6. Mechanical Ventilation per R403.6
7. Equipment sizing per R403.7
8. Snow melt controls per R403.9
9. Pool and spas per R403.10
10. Lighting equipment per R404



Up to 19 items may be MANDATORY in the Residential Energy Code

Total UA Alternative

Trading off the R-values and U-Factors of building envelope assemblies

Achieve equivalence to minimum prescriptive requirements



Above-grade wall R-value

Attic insulation

Window U-factor

Roof insulation

Ext. door U-factor

Basement wall R-value

Table R402.1.4: U-Factor Alternative

Climate Zone	Fenestration U-Factor	Skylight U-Factor	Ceiling U-Factor	Frame Wall U-Factor	Mass Wall U-Factor	Floor U-Factor	Basement Wall U-Factor	Crawl Space Wall U-Factor
4	0.32	0.55	0.026	0.060	0.098	0.047	0.059	0.065
5	0.30	0.55	0.026	0.060	0.082	0.033	0.050	0.055
6	0.30	0.55	0.026	0.045	0.060	0.033	0.050	0.055

R-Values and U-Values

R-Value

- Uniform material
- Additive

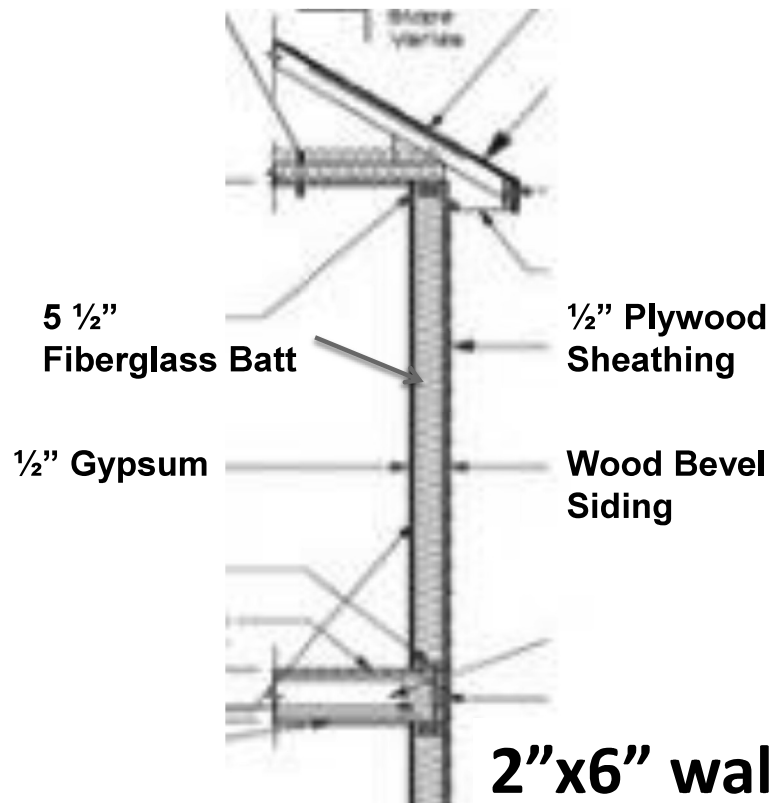
U-Factor

- Different materials
- Averaged

 National Fenestration Rating Council® CERTIFIED		WinTech Window Technology, Inc. 70 Series 2-7/8" Vinyl Horz Slider - AIR IG 5/8" CPD# WNT-K-1-00102-00001 SS CL AIR SS CL - 625IG	
ENERGY PERFORMANCE RATINGS			
U-Factor (U.S./I-P)		Solar Heat Gain Coefficient	
0.49		0.66	
ADDITIONAL PERFORMANCE RATINGS			
Visible Transmittance		Condensation Resistance	
0.68		44	
<small>Manufacturer stipulates that these ratings conform to applicable NFRC procedures for determining whole product energy performance. NFRC ratings are determined for a fixed set of environmental conditions and specific product size. NFRC does not recommend any product and does not warrant the suitability of any product for any specific use. www.nfrc.org. Consult manufacturer literature for other performance information.</small>			



R-Values and U-Factors



What is the nominal R-value of this wall?

What is the U-factor of this 30' wall?

Next Slide

R-Values/ U-Factors

Framing R-value:

$$0.68 + 0.45 + 5.5 + 0.62 + 0.8 + 0.17 = R-8.22$$

Insulation R-value:

$$0.68 + 0.45 + 21 + 0.62 + 0.8 + 0.17 = R-23.72$$

$$(.12 * 8.22) + (.88 * 23.72) = R-21.86$$

$$U\text{-factor} + 1/21.86 = U-0.045$$

R-Values of Common Building Components

Component/Material	R-value
Interior Air Film	0.68
Exterior Air Film	0.17
½" Gypsum	0.45
½" Plywood	0.62
2"x6" Wood Stud	5.5
Wall Cavity	21
Wood Bevel Siding	0.8

Total UA Alternative R402.1.5

Total building thermal envelope
 $UA \leq$ code max. total UA

Allows tradeoffs, flexibility

Software, e.g., Rescheck (most common), REM/Rate, Energy Gauge USA, Ekotrope





2018 IECC Energy Efficiency Certificate

Insulation Rating	R-Value
Above-Grade Wall	
Below-Grade Wall	
Floor	
Ceiling / Roof	
Ductwork (unconditioned spaces):	

Glass & Door Rating	U-Factor	SHGC
Window		
Door		

Heating & Cooling Equipment	Efficiency
Heating System: _____	
Cooling System: _____	
Water Heater: _____	

Name: _____ Date: _____

Comments

Why Use REScheck?

One or more envelope assemblies don't meet prescriptive R-value or U-factor requirements

Manual U-factor calculation is complicated

Building envelope complicated


Building envelope has multiple different types of assemblies and components

REScheck provides Compliance Report and Certificate

Introduction to:



Where should the Certificate go? Is this a mandatory item?



2018 IECC Energy Efficiency Certificate

Insulation Rating	R-Value
Above-Grade Wall	20.00
Below-Grade Wall	15.00
Floor	0.00
Ceiling / Roof	38.00
Ductwork (unconditioned spaces):	_____

Glass & Door Rating	U-Factor	SHGC
Window	0.30	0.40
Door	0.29	0.40

Heating & Cooling Equipment	Efficiency
Furnace	95 AFUE
Air Conditioner	14 SEER
Water Heater: _____	_____

Name: _____ Date: _____

Comments _____

Energy Efficiency Certificate

Permit No. _____
Address: 5601 Lone Oak Dr

Insulation Ratings	R-Value
Roof/Ceiling:	With attic <u>A-57</u> Without attic <u>A-</u>
Walls:	Frame <u>A-20</u> Mass <u>A-</u> Basement <u>A-15</u> Crawlspace <u>A-</u>
Floors:	Over unconditioned space <u>A-20</u> Slab-edge (depth) <u>A-16/2 ft</u>
Ducts:	Outside conditioned space <u>A-</u>

Fenestration Ratings	NFRC UFactor	NFRC SHGC
Opaque doors:	<u>U</u>	
Windows:	<u>U .35</u>	<u>.24</u>
Skylights:	<u>U .31</u>	<u>.50</u>

Equipment Performance	Efficiency
Heating system:	HSPF/AFUE <u>96.5</u>
Cooling system:	COP/SEER <u>16</u>
Water Heater/Boiler:	EF/E ₁ or E ₂

Builder/Designer: _____
Certified by: _____ Date: 11/30/12
Adopted Code Edition: _____

THIS CERTIFICATE SHALL BE PERMANENTLY POSTED ON OR IN THE ELECTRICAL DISTRIBUTION PANEL AS REQUIRED BY ENERGY / RESIDENTIAL CODES

Simulated Performance vs. ERI

Simulated Performance R405

- Proposed Home vs. Reference Home
- Basis: Total Annual Energy Cost
- Single Compliance Threshold

ERI R406

- Proposed Home vs. Reference Home
- Basis: Total Annual Energy Use
- Graduated Scale – Percent Better than Reference



Simulated Performance Alternative Path (R405)

REM/Rate™

Residential buildings

Software/Cloud-based

More flexibility

ekotrope

High efficiency HVAC equipment

Some flexibility with insulation levels

Mandatory requirements

EnergyGauge®

Energy and Economic Analysis Software

Annual Energy Cost of Proposed Building \leq Reference Building

Permitting and Certificate of Occupancy

Simulated Performance Alternative

NY-ECCC 2020 Energy Cost Compliance

Property
123 ABC
Albany, NY

Organization
Newport Ventures
518-377-9410
Matt Evans

HERS
Projected Rating
Rater ID:8013690

Weather: Albany, NY
New House
SAMPLE.big

Builder
Dream Builders

Annual Energy Cost	\$/yr	
	NY-ECCC 2020	As Designed
Heating	1102	985
Cooling	214	198
Water Heating	187	187
Mechanical Ventilation Fan	34	34
SubTotal - Used to Determine Compliance	1536	1405
Lights & Appliances (minus MechVent)	1259	1145
Photovoltaics	-0	-0
Service Charge	0	0
Total	2795	2549

Mandatory Requirements

Annual Energy Cost Check	PASSES
Duct Insulation R-Value Check (per Section 405.2)	PASSES
Window U-Value and SHGC Check (per Section 402.5)	PASSES
Home Infiltration (Section 402.4.1)	PASSES
Duct Testing (Section 403.3.3)	PASSES
Mechanical Ventilation (Section 403.6)	PASSES
Mechanical Ventilation Fan Efficacy (Section 403.6.1)	PASSES
Mandatory Requirements Check Box (NY-ECCC 2020)	PASSES

This home MEETS the annual energy cost requirements of Section 405 of the Energy Conservation Construction Code of New York-2020 in climate zone 5A. In fact, this home surpasses the requirements by 8.6%.

Name Matt Evans	Signature
Organization Newport Ventures	Date 16 February 2021

REM/Rate Compliance Sheet

REWRate - Residential Energy Analysis and Rating Software v16.0.6
 This information does not constitute any warranty of energy costs or savings.
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Energy Rating Index Compliance (R406)

Target

Changes to ERI
Targets

Less Stringent

Mandatory Minimums

Shift in Insulation
& Window
Minimums

Only Applicable if
Using On-site
Renewable

ANSI Reference Standard

RESNET/ICC
301

Standard that
Governs HERS
Rating



Energy Rating Index Compliance Alternative (R406)

Residential

Numerical index – 0 – 100

Baseline: 2006 IECC

Similar to ENERGY STAR scale

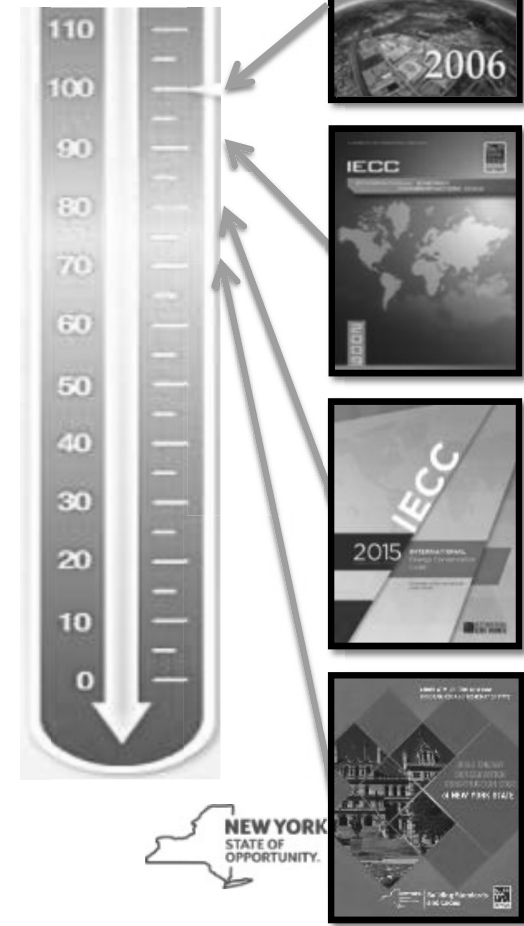
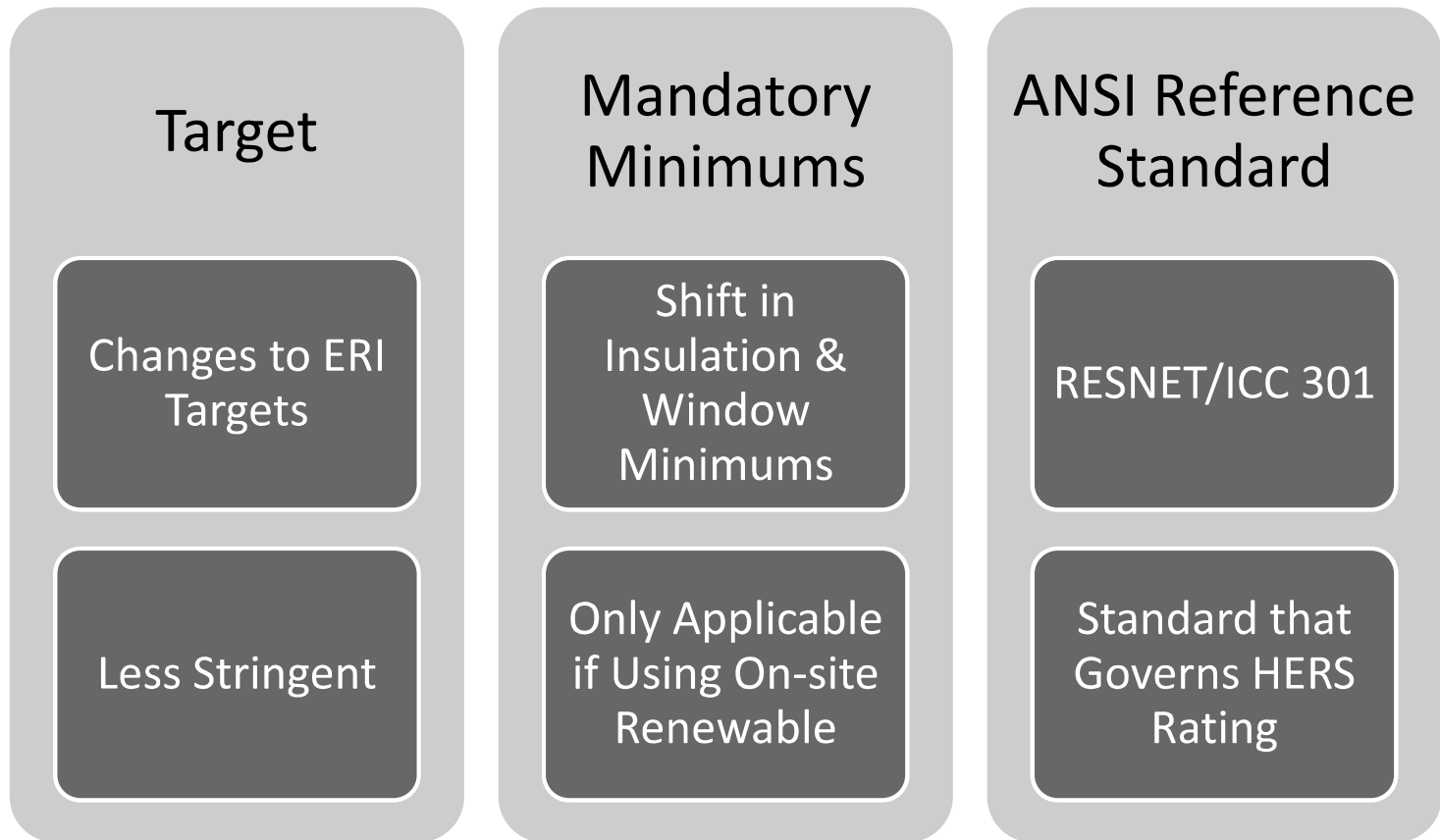
HERS Rater needed

Must still meet mandatory requirements

Ducts outside thermal envelope minimum R-6



Energy Rating Index (ERI) –Based Compliance



IECC 2018 Energy Rating Index Report

Property
123 ABC
Albany, NY

Organization
Newport Ventures
518-377-9410
Matt Evans

ERI
Preconstruction

Annual Energy Consumption		
	Rated Home Calculated Energy Use (MBTU)	Rated Home Cost (\$/yr)
Heating	86.1	935
Cooling	1.9	77
Water Heating	8.5	91
Lights & Appliances	35.7	1287
Photovoltaics	-0.0	-0
Total	132.2	2391

Projected Rating: Based on Plans - Field Confirmation Required.

Annual Estimates			
Electric(kWh):	9532	C02 Emissions(Tons):	9
Natural gas(Therms):	996	Energy Savings (\$)**:	1795
*Based on standard operating conditions			
**Based on the 2018 IECC Energy Rating Index Reference Design Home			

TARGET ERI: 61	2018 ERI: 50	FAIL
This home DOES NOT meet the 2018 Energy Rating Index requirements of Sections 406.3 and 406.4 of the 2018 IECC for climate zone 5A. This 2018 ERI is calculated per ANSI/RESNET/ICC Standard 301-2014, as published January 2016 with Addenda A & B.		
Name Matt Evans	Signature	Date 16 February 2021
Organization Newport Ventures		

Mandatory Requirements			
2018 ERI Target	PASS	Duct Insulation (Ducts outside R-6, inside is R-0)	PASS
2009 IECC UA	PASS	Maximum Fenestration U-factor/SHGC (R402.5)	PASS
Duct Testing (2015)	PASS	Air Leakage (5 ACH50 for CZ1-2, 3 ACH50 for CZ3-8)	PASS
Mechanical Ventilation	PASS	High efficacy lights installed (90%)	PASS
Hot water pipe insulated to R-3	FAIL	Mandatory Requirements Checkbox (2018 IECC)	FAIL
Mechanical Ventilation Efficacy	PASS		

Emissions Data	Provider Data and Seal
Pollution Prevented	TITLE
Carbon Dioxide (CO2) - tons/year	7.5 Company
Sulfur Dioxide (SO2) - lbs/year	4.1 Address
Nitrogen Oxides (NOx) - lbs/year	17.0 City, State, Zip
	Phone #

REWRate - Residential Energy Analysis and Rating Software v16.0.6
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ERI Compliance Report Section R406

Maximum Energy Rating Index

Climate Zone	Energy Rating Index (2015 IECC) 2016 ECCCCNYS	Energy Rating Index (2018 IECC) 2020 ECCCCNYS
4	54	62
5	55	61
6	54	61



NY-ECCC 2020 Certificate

123 Wrong Way , Albany, NY 90210

Building Envelope Insulation

Ceiling	R-49.0
Above Grade Walls	R-21.0
Foundation Walls	R-15.0
Exposed Floor	NA
Slab	R-0.0 Edge, R-0.0 Under
Infiltration	2.70 ACH50
Duct	NA
Total Duct Leakage	154.00 CFM @ 25 Pascals

Window Data	U-Factor	SHGC
Window	0.300	0.290

Mechanical Equipment

HEAT: Fuel-fired air distribution, Natural gas, 94.0 AFUE.

COOL: Air conditioner, Electric, 13.0 SEER.

DHW: Conventional, Natural gas, 0.54 EF, 50.0 Gal.

HERS Index: 63

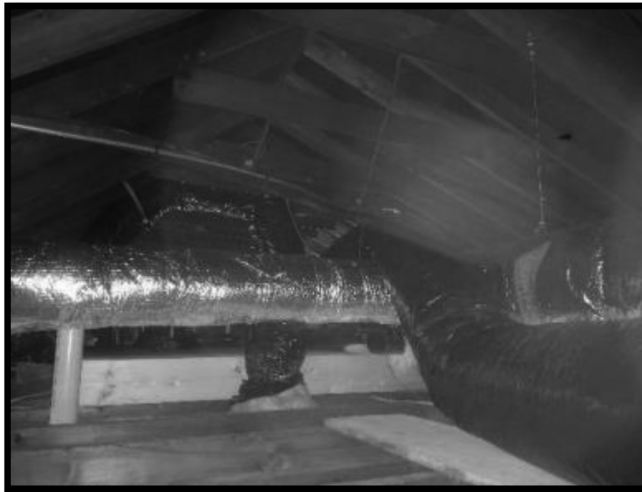
Builder or Design Professional

Signature _____

REM/Rate - Residential Energy Analysis and Rating Software
v16.3.4.1016

Compliance Certificates Automatically Generated

Failed Duct Leakage Test



Leaky Ducts



Failed Duct Blaster



Flexibility Allowed
in Section R405

Tradeoffs and Mandatory Requirements

Problem areas and compliance issues

Slab-On-Grade Floors

**Not required in jurisdictions designated by the code official as having a very heavy termite infestation*

Table R402.1.2- Listed

Table R402.1.4- Not Listed

Must comply with R402.1.2 Prescriptively



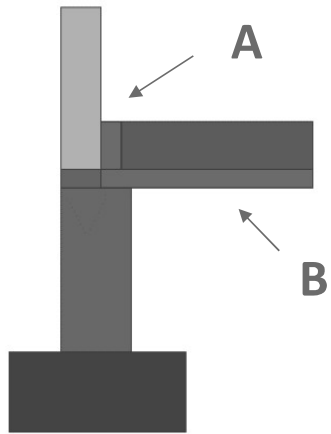
Section R402.2.10 Slab-On-Grade Floors

Prescriptive using
Table R402.1.2 (The R-
Value Table)

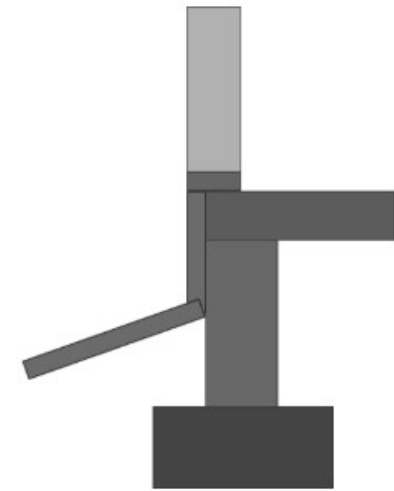
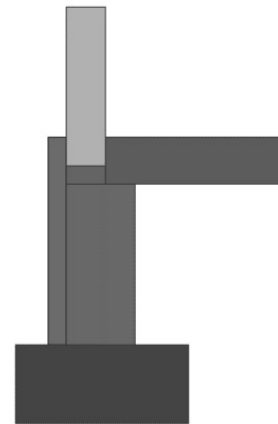
No equivalent U-Factor
method listed in table
R402.1.4.



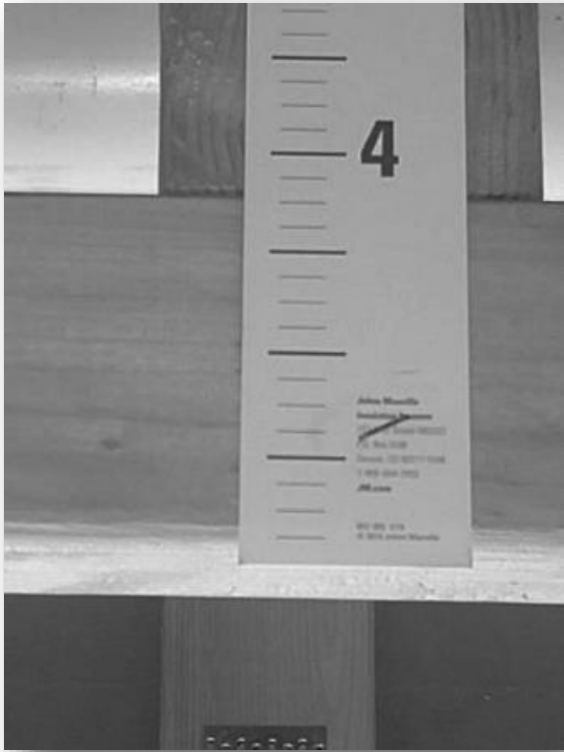
Slab Insulation Methods



$A+B = \text{Insulation Depth}$



Attic Insulation



Insulation Depth Markers

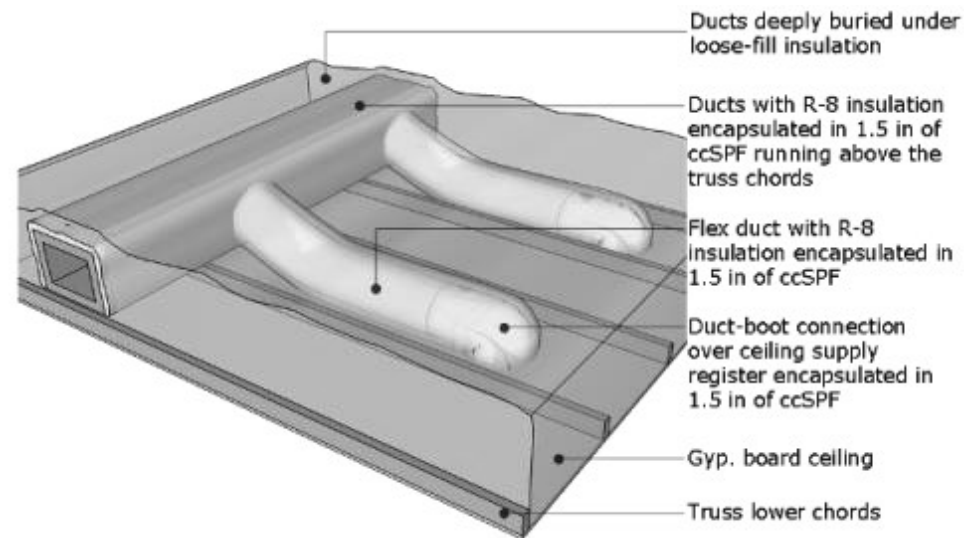
Buried Ducts (R403.3.6)

Supply and return ducts: at least R-8 insulation

Insulation above and below ducts at least R-19, not including duct insulation

Effective duct insulation of R-25:

- If duct within 5.5" of ceiling,
- Surrounded with \geq R-30 insulation, and
- Top of duct not less than 3 ½" below top of insulation



Building America Solutions Center

Buried Ducts (R403.3.6)

Ducts considered in conditioned space if:

- Compliant with measures on previous slide
- Air handler located in conditioned space
- Measured duct leakage to outside ≤ 1.5 cfm per 100 sf conditioned floor area
- Ceiling insulation above duct \geq proposed ceiling insulation R-value minus duct insulation R-value



basc.pnnl.gov



Building America
Solutions Center

Mechanical Ventilation (R403.6)

Mandatory



All New Homes Must Be 3ACH50 or Tighter (R402.4.1)



IRC or IMC (R303.4 and Section M1507 or 403.3.2)

*All New Homes Must Include Whole House Mechanical Ventilation

Whole House Mechanical Ventilation

Single family,
Two-family,
and
Townhomes

M1505.4.3(1)

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

M1505.4.3(2)

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

M1507.4

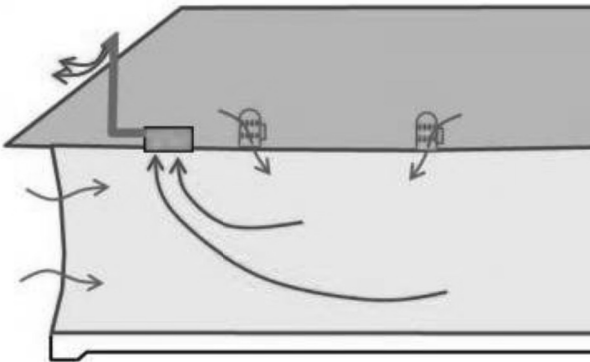
TABLE M1507.4 MINIMUM REQUIRED LOCAL EXHAUST RATES FOR ONE- AND TWO-FAMILY DWELLINGS

AREA TO BE EXHAUSTED	EXHAUST RATES
Kitchens	100 cfm intermittent or 25 cfm continuous
Bathrooms-Toilet Rooms	Mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous

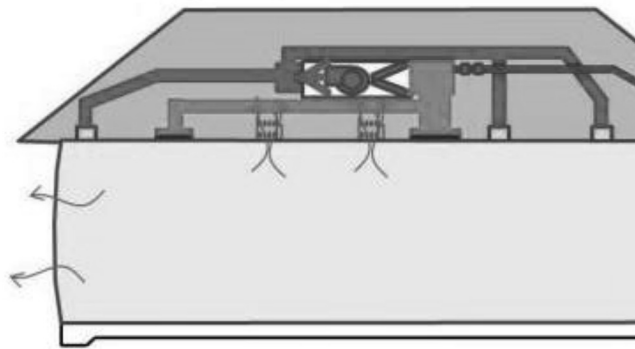


Mechanical Ventilation

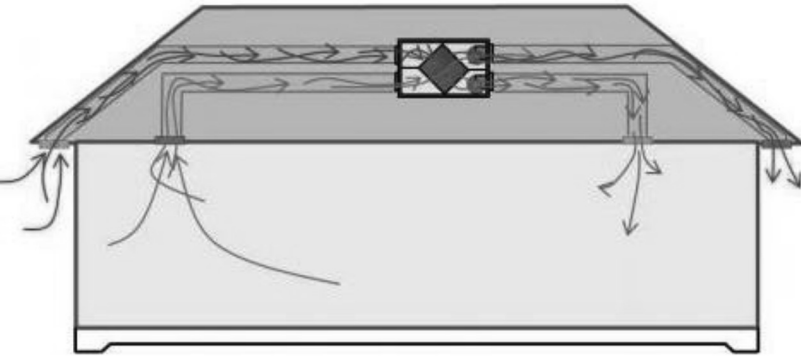
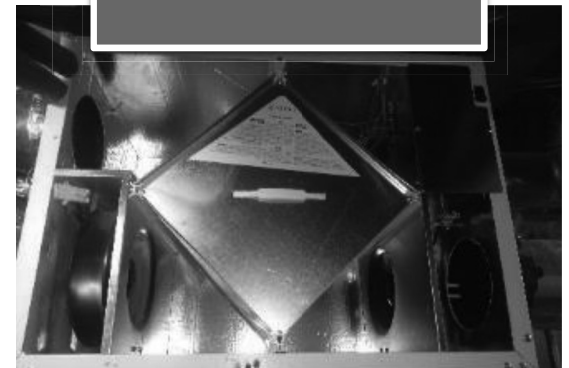
Exhaust



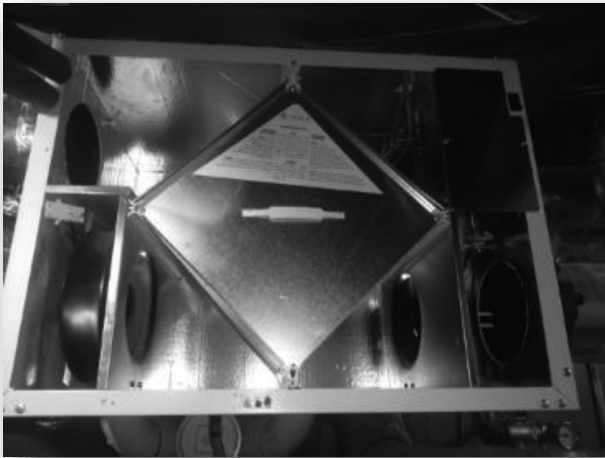
Supply



Balanced



Mechanical Ventilation



Size



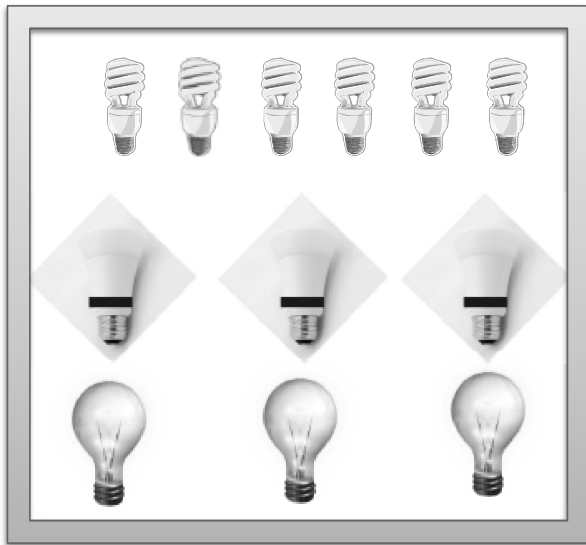
Controls



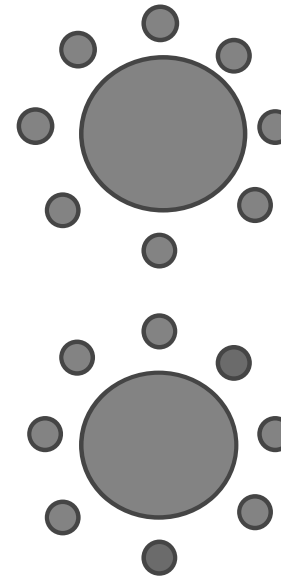
Installation

High-Efficacy Lamps

~~2015 ECCC
75%~~



2020 ECCCNY
90% of fixtures



PASS

FAIL

REQUIRED TESTING FOR RESIDENTIAL BUILDINGS

Blower Door Testing Mandatory

3 ACH

Approved third party

Signed Results

ANSI/RESNET/ICC 380 or ASTM E
779 or ASTM E1827



Blower Door Exceptions

Low-rise buildings with multiple dwelling units:

Optional metric: 0.3 cfm/sf surface area

Sampling protocol

- More than 7 units
- First 7 units tested
- Remaining sampled at 1 in 7
- If one fails, test two additional units



Duct Leakage Testing

Mandatory when ducts outside building thermal envelope

Written report signed and provided to code official

Prescriptive 4CFM per 100 square feet

Performance



Duct Sealing

Seal up the joints

- Mastic
- UL 181 listed tape
- Air-impermeable spray foam

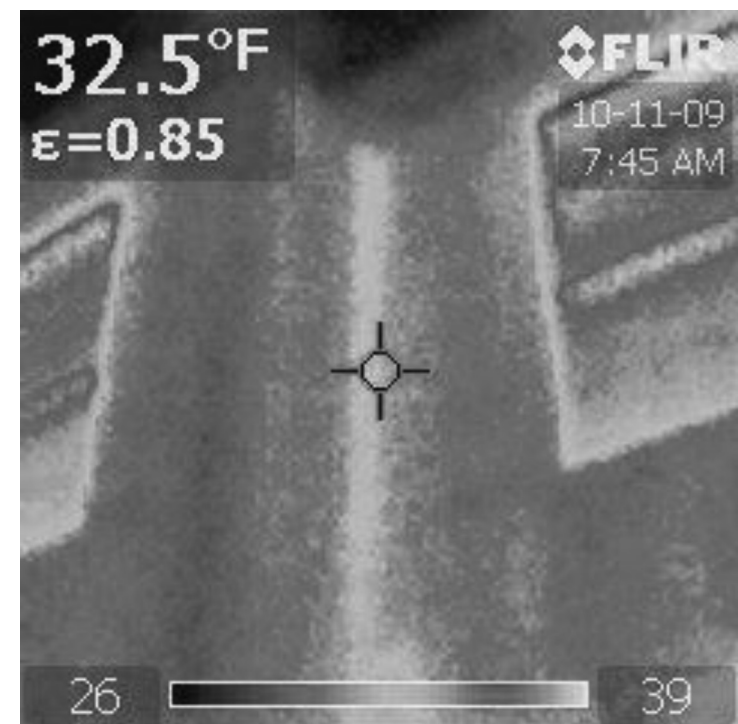
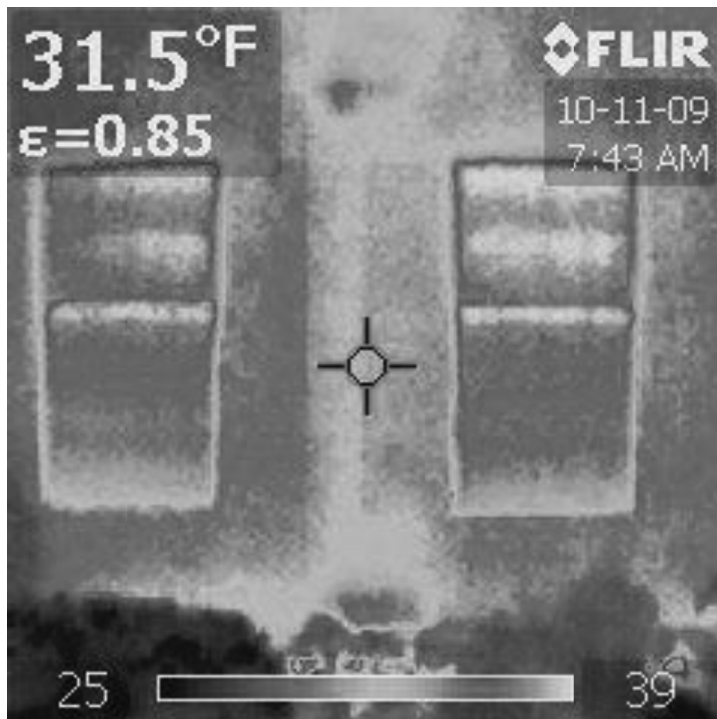
Building cavities shall not be used as ducts or plenums



Air Sealing and Insulation 101

Areas of a residential structure that must be air sealed

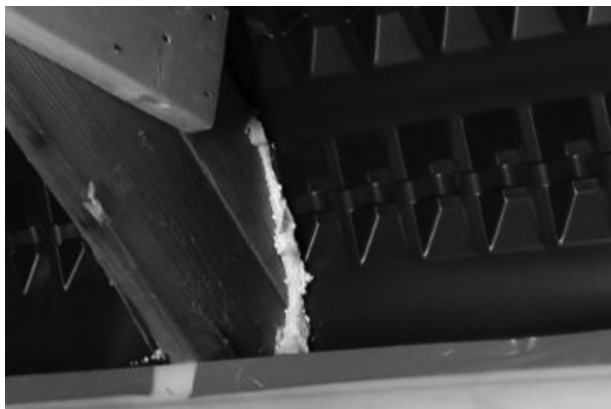
Table R402.4.1.1



Ceiling/Attic



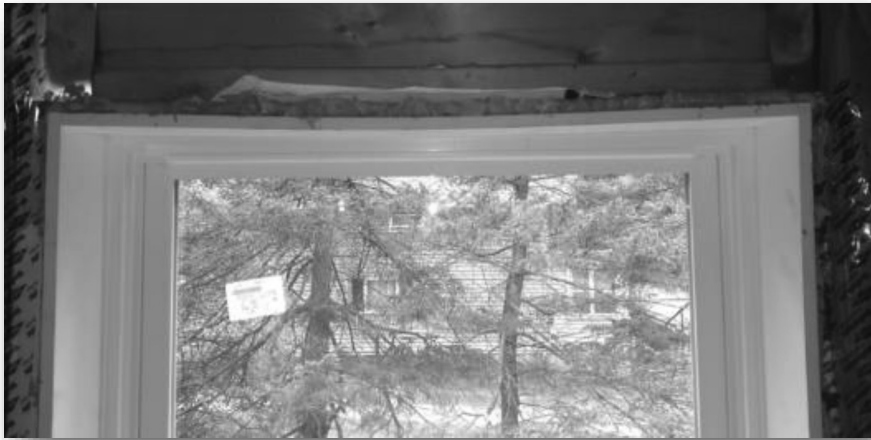
Prescriptive- Specific Insulation Requirements Eave Baffles (R402.2.3)



Walls



Windows, Skylights and Doors



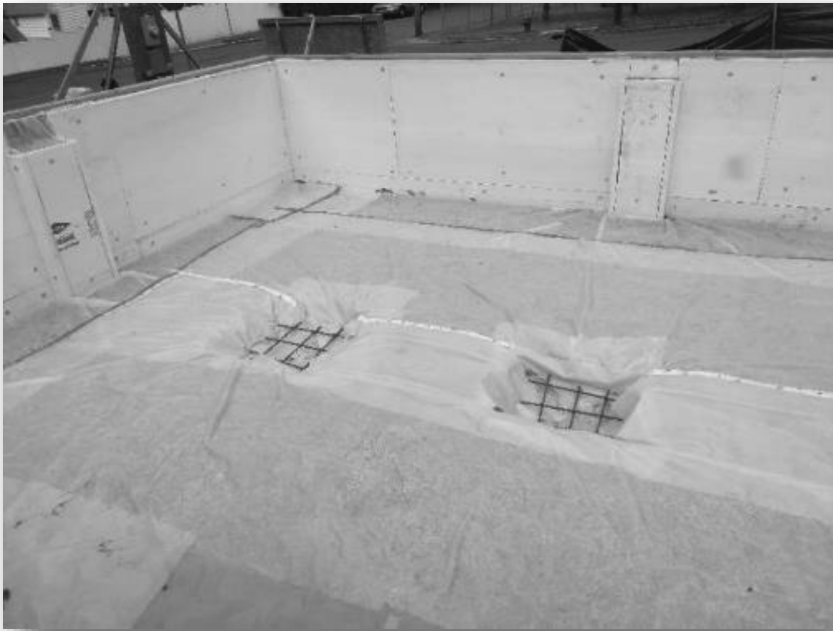
Rim Joists



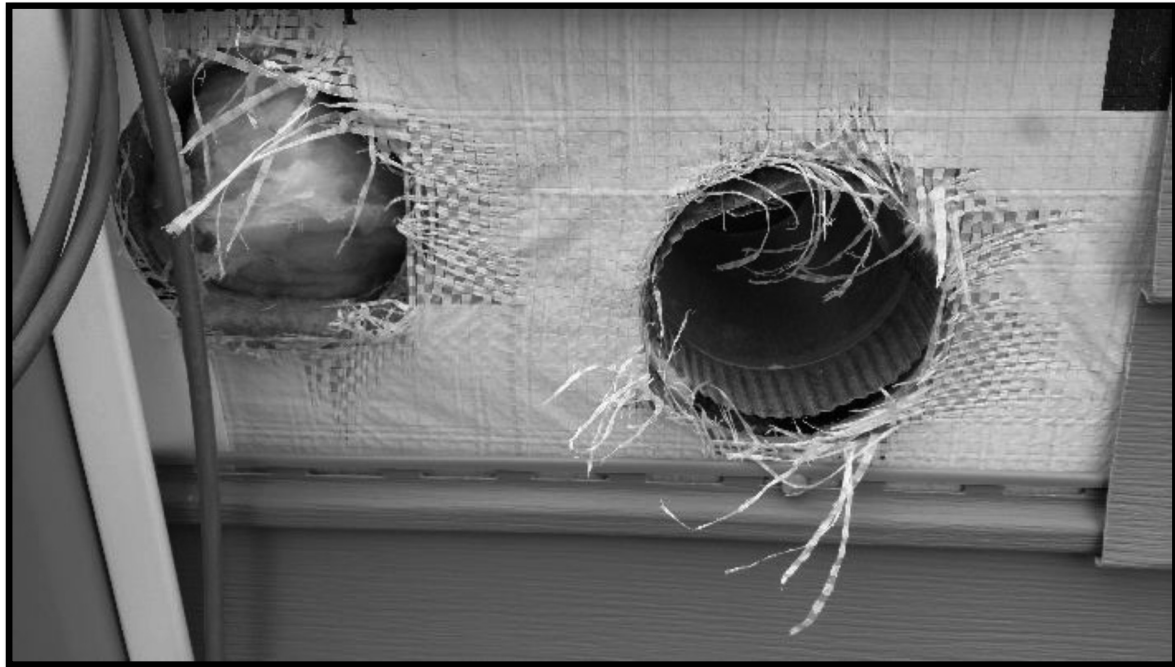
Floors



Crawl Space Walls



Shaft & Penetrations



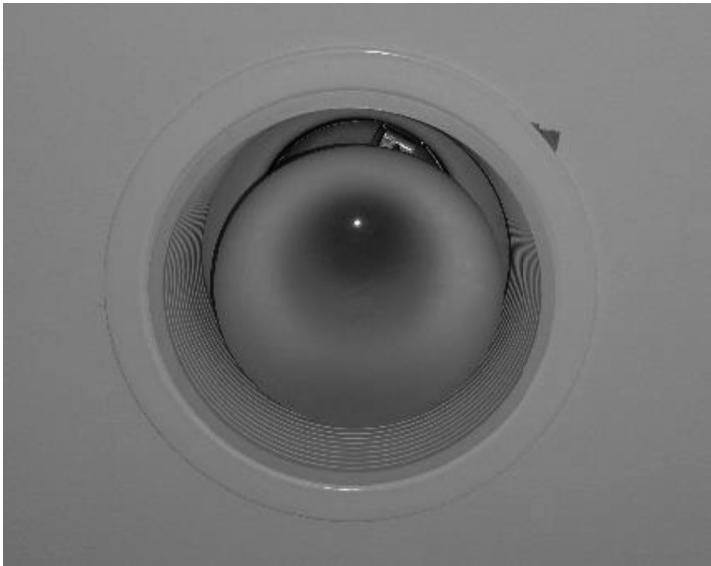
Narrow Cavities



Garage Separation



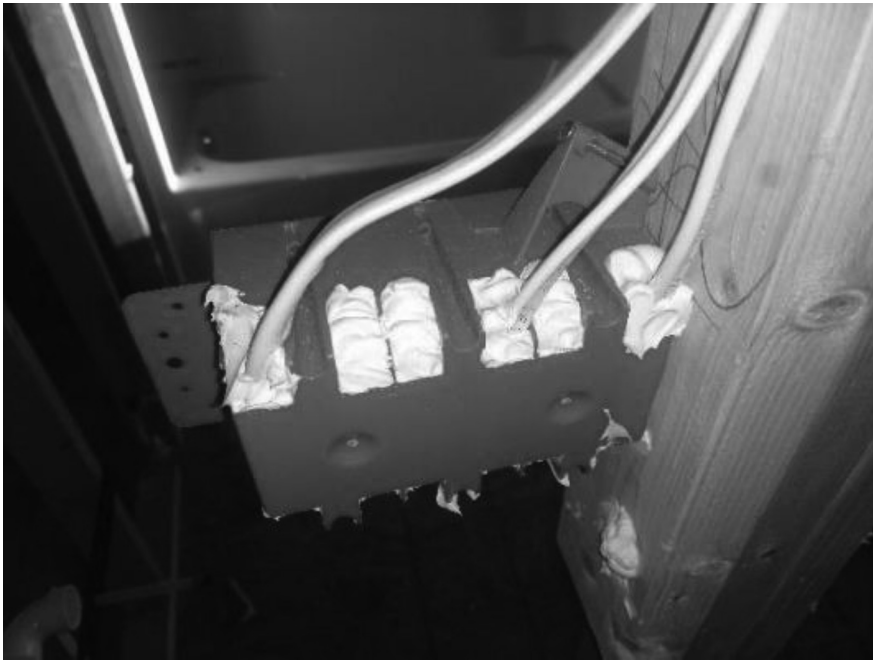
Recessed Lighting



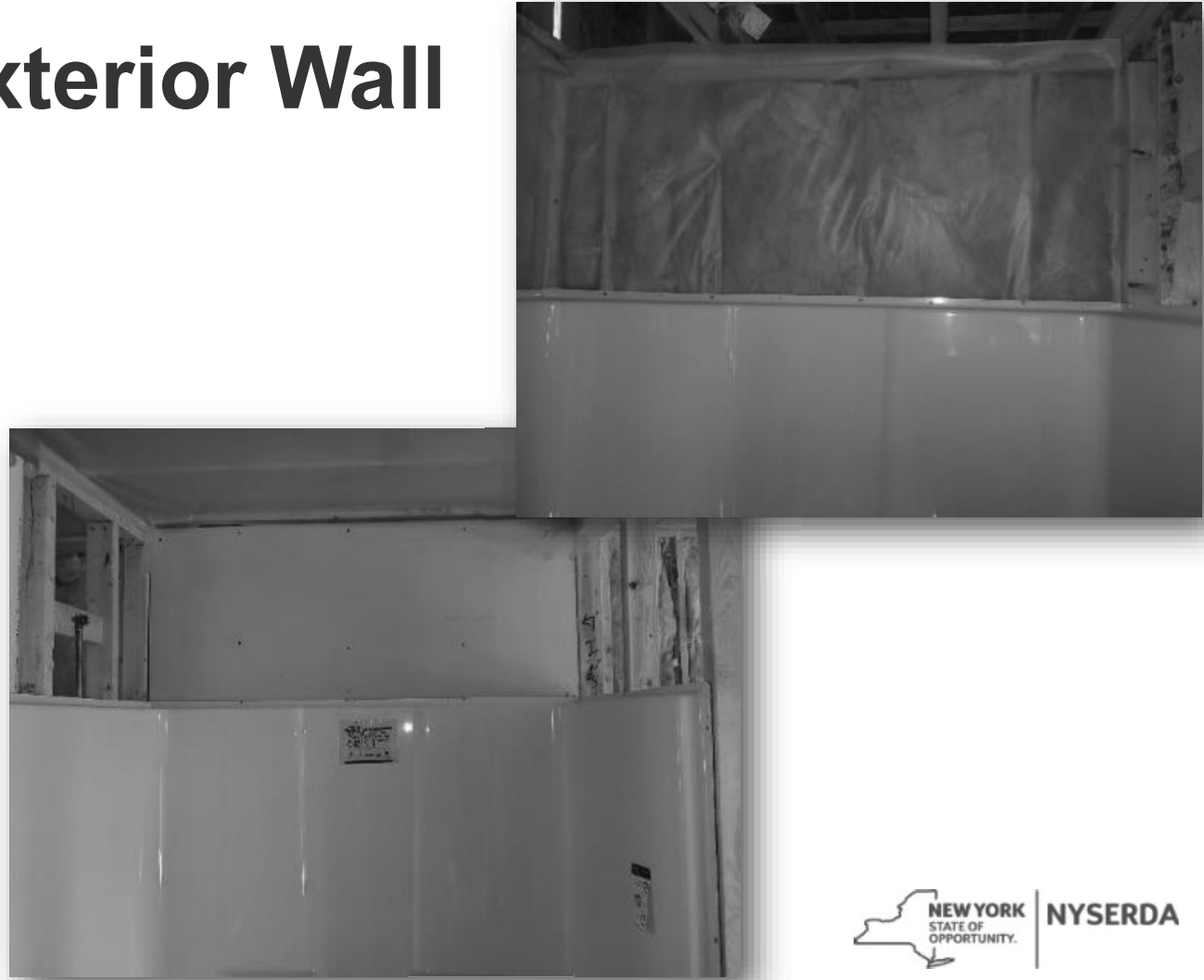
Plumbing & Wiring



Electrical box or Other Boxes



Shower/tub on Exterior Wall



HVAC Register Boots



Documentation by Compliance Path

Prescriptive

Energy Details on
Construction Documents

Material Documentation

Calculation for
Prescriptive Tradeoffs

R405

Performance

Energy Details on
Construction Documents

Material Documentation

Permit Compliance Report

C of O Compliance Report

R406

ERI

Energy Details on
Construction Documents

Material Documentation

Permit Compliance Report

C of O Compliance Report

Information on Construction Documents

Equipment and system controls

Duct sealing, duct and pipe insulation and location

Air sealing details

Building thermal envelope shall be presented on the construction documents

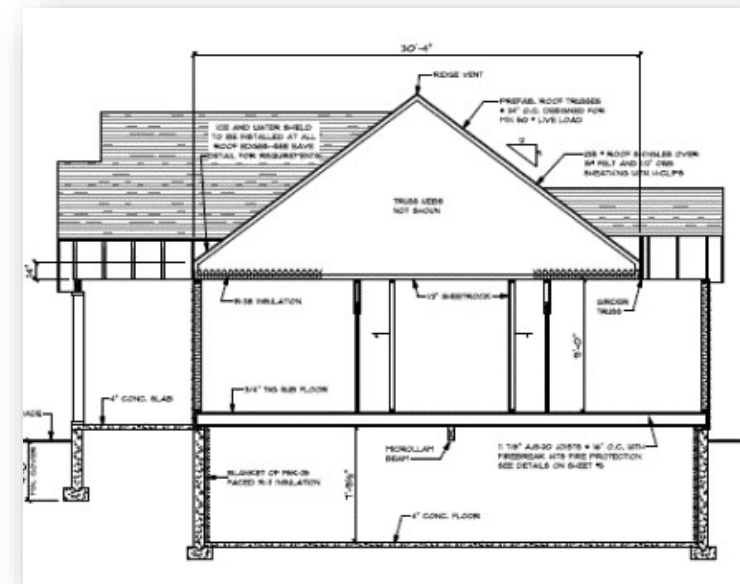
Insulation materials and their R-values

Fenestration U-factors and SHGC

Area-weighted U-factor and SHGC

Mechanical system design criteria

Mechanical and service water-heating systems and equipment types, sizes and efficiencies



Envelope Information: Where to Put It

Window Schedule

ROOM	S.F.	UNIT	LIGHT REQ.	LIGHT ACT.	VENT/EGRESS REQ.	VENT/EGRESS ACT.	CLEAR OPEN WIDTH	CLEAR OPEN HEIGHT	CLEAR OPEN SQ. FT.	U-VALUE
FAMILY ROOM	208	2-3252	16.64	23.2	8.32	11.4	32 15/16"	25 1/16"	5.7	.30
DINING	225	6068	18.0	31.5	9.0	14.72	40.3125"	74.875"	14.72	.30
OFFICE	94	2-3052	7.52	23.2	3.76	11.4	30 15/16"	25 1/16"	5.3	.30
MASTER BEDROOM	206	2-3252	16.48	23.2	8.24	11.44	32 15/16"	25 1/16"	5.7	.30
BEDROOM #2	152	2-3252	12.16	23.2	6.08	11.4	32 15/16"	25 1/16"	5.7	.30
BEDROOM #3	106	2-3252	8.48	23.2	5.7	11.4	32 15/16"	25 1/16"	5.7	.30
BEDROOM #4	133	2-3252	10.64	23.2	5.7	11.4	32 15/16"	25 1/16"	5.7	.30

DOOR SCHEDULE

FIRE RATED DOORS R=7.1
 OVERHEAD DOOR R=18
 EXTERIOR SOLID DOORS R=5.6
 EXTERIOR GLASS DOOR R=4.2

SHGC?

Envelope Information: Where to Put It

Energy Efficiency

The insulation envelope shall meet the requirements of Chapter 4 of the Energy Conservation Construction Code of New York State for Climate Zc 5 (Saratoga County). Code compliance shall be demonstrated using the Component Performance Approach (Per Section 401.2.3)

The Envelope Thermal values shall be as follows, unless noted otherwise on plans:

- Exterior wallR-20
- Roof/ceilingR-38
- FloorR-30
- Foundation wall (6-foot depth from top of wall)
 - R-13 (R-6.4 where adjacent to basement stairs)
 - Slab edge insulation (4-depth).....R-10 minimum
 - Glazing.....U=.30 (U=.35 for basement sash windows)
 - Entrance doorsU=.15 to .23 (depending on amount of glazing)
 - Ducts located outside the thermal envelope.....R-6 (R-8 in unheated attic space)

Building insulation shall be full thickness fiberglass batt insulation in sizes and locations called for or shown on the plans.

Rigid insulation below grade shall be extruded polystyrene as manufactured by DOW Chemical Company or equal (K-0 .10G/inch).

Vapor barrier shall be sized Kraft paper encasing SPEC HH-1-52C; Type 1, Class B on exterior walls, ceiling and floor.

Ventilation of rafter and attic space shall be provided by vented soffit and raised ridge vent where shown or noted. Provide blocking and baffles to ensure adequate air channel for ventilation.

HVAC equipment to be sized based on load calculations in accordance with ACCA Manual J

All HVAC supply ducts, air handlers and filter boxes shall be sealed. Joists and seams shall comply with Section M1601.3 of the RCNY. The Code Enforcement Official may require a third-party inspection agency to perform the verification. The building thermal envelope shall be sealed by caulking, gasketing, weather stripping or otherwise sealed with an air barrier material, suitable film or solid material.

- A. All joists and penetrations
- B. Fill all voids between jambs and framing with loose or foam insulation.
- C. Walls and ceilings separating a garage from conditioned space.
- D. Behind tubs and showers on exterior walls.
- E. Attic access openings.

Window Air Leakage

Windows, Skylights, and Sliding Glass Doors

- 0.3 CFM/SF

Swinging Doors

- 0.5 CFM/SF

 National Fenestration Rating Council® CERTIFIED	*No Grid* Dual Glazed MFR#073	
	EXTREME SERIES: 450 VINYL Double Low-e argon	
ADW-A-160-00927-00001		
ENERGY PERFORMANCE RATINGS		
U-Factor (U.S./I-P)	Solar Heat Gain Coefficient	
0.31	0.28	
ADDITIONAL PERFORMANCE RATINGS		
Visible Transmittance	Air Leakage (U.S./I-P)	
0.52	< 0.3	
<small>Manufacturer stipulates that these ratings conform to applicable NFRC procedures for determining whole product performance. NFRC ratings are determined for a fixed set of environmental conditions and a specific product size. NFRC does not recommend any product and does not warrant the suitability of any product for any specific use. Consult manufacturer's literature for other product performance information. www.nfrc.org </small>		

Documentation by Compliance Path: Required Information – HVAC Systems

Equipment

Heating/Cooling Loads
Manual J

Equipment Selection/Sizing
Manual S

Equipment Types

Ducts/Piping

Layout/Location

Leakage Testing (if required)

Sealing/Materials

Insulation

Ventilation

Sizing

Equipment Information

Controls

Manual J

Accuracy is important!

	Manual J Report	Newport's Data
Design Date: Reference County	Albany	Saratoga
Construction Type	Semi-loose	Tight
Windows	U 0.56/ SHGC 0.66	U 0.23/ SHGC 0.27
Attic Insulation	R-38	R-44
Floor Insulation	R-19	Not applicable
Foundation Wall	Not shown	R-25
Window Area	84	154
AGW Area	396	2828
Square Footage	432	2400 (1200 FF and 1200 Basement)
Ceiling Area	432	1200

Manual J: Sample C

System 1 Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
1D-cv-o: Glazing-Double pane, operable window, clear, vinyl frame, u-value 0.57, SHGC 0.56	254	10,133	0	15,112	15,112
11P: Door-Metal - Polyurethane Core	21	426	0	171	171
15A11-0fcw-6: Wall-Basement, , framing with R-11 sill to floor in 2 x 4 cavity, filled core, no board insulation, plus interior finish, wood studs, 0' floor depth	873	3,904	0	374	374
12E-0sw: Wall-Frame, R-19 insulation in 2 x 6 stud cavity, no board insulation, siding finish, wood studs	2078.7	9,896	0	2,743	2,743
16B-38: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), Vented Attic, No Radiant Barrier, Dark Asphalt Shingles or Dark Metal, Tar and Gravel or Membrane, R-38 insulation	837.5	1,523	0	1,132	1,132
21A-20: Floor-Basement, Concrete slab, any thickness, 2 or more feet below grade, no insulation below floor, any floor cover, shortest side of floor slab is 20' wide	938	1,773	0	0	0
Subtotals for structure:		27,655	0	19,532	19,532
People:	6		1,200	1,380	2,580
Equipment:			0	1,200	1,200
Lighting:	0			0	0
Ductwork:		0	0	0	0
Infiltration: Winter CFM: 109, Summer CFM: 54		8,306	794	1,010	1,804
Ventilation: Winter CFM: 0, Summer CFM: 0		0	0	0	0
AED Excursion:		0	0	1,141	1,141
System 1 Load Totals:		35,961	1,994	24,263	26,257

Check Figures

Supply CFM:	1,114	CFM Per Square ft.:	0.428
Square ft. of Room Area:	2,605	Square ft. Per Ton:	1,190
Volume (ft ³) of Cond. Space:	24,399		

System Loads

Total Heating Required Including Ventilation Air:	35,961 Btuh	35.961 MBH
Total Sensible Gain:	24,263 Btuh	92 %
Total Latent Gain:	1,994 Btuh	8 %
Total Cooling Required Including Ventilation Air:	26,257 Btuh	2.19 Tons (Based On Sensible + Latent)

Pillars of Success

Air Sealing

HVAC Compliance

Ventilation Systems

Lighting

Insulation Installation

Others?



Thank You!

Matt Evans

518-377-9410

Email:

mevans@newportventures.net

Website:

www.newportventures.net

