

Building to Meet the New MA State Stretch Code Changes (HERS 42/45): What Builders Need to Know – Session IV



Announcements:

10% Discount on NEHERS Memberships Between 12/1/23 and 1/31/24

Member Category	Annual Dues ² <i>(Paid after January 31st)</i>	Early Bird Dues <i>(Must be paid by January 31st)</i>
Certified HERS Rater	\$120.00	\$108.00
Dual Rater & RESNET-Accredited Independent Trainer	\$240.00	\$216.00
Accredited Rating Provider	\$350.00 + \$66.50/Rater ¹ (capped at 50)	10.0% Discount off Annual Calculated Fee
Dual Accredited Rating & Training Provider	\$700.00 + \$66.50/Rater ¹ (capped at 50)	10.0% Discount off Annual Calculated Fee
ASSOCIATE – Student/Individual	\$60	\$54
ASSOCIATE – Sponsor	\$500	\$450
HERS Program	\$500 - \$5,000 (\$.90 per rating done in state suggested)	10.0% Discount off Annual Calculated Fee

(1) Rating Provider variable fee is calculated from Certified Rater count on Jan 1. Providers may opt to include independent raters associated with their providership in this count.
 (2) Members joining after July 1 pay 50% of Annual Dues. This discount does not apply to the ASSOCIATE- Sponsor or Program membership levels.
 (3) For additional information on the benefits and incentives for Sponsor Membership, contact Betsy Ames at info@nehers.org or call/text 978-633-3013.

<https://nehers.org/membership>



Announcements:

Please contact us at info@nehers.org if you'd like to join the NEHERS Alliance **Energy Codes Committee!**

We review the Residential Energy Code with respect to HERS Raters concerns and take actions where appropriate to attempt to improve the clarity and implementation of Residential Energy Code.

Next Meeting is January 9th at 1PM EST.
(Meets quarterly).



Announcements:

NEHERS
NORTHEAST HOME ENERGY RATING SYSTEM ALLIANCE

HERS RATER TRAINING

January 22 – February 2 and February 12 - 16, 2024
TRAINERS: Performance Systems Development **PSD** *Moving Energy Efficiency Forward*

SCHOLARSHIP DEADLINE EXTENDED: January 2nd at 5 PM (EST)
Final Registration Deadline is January 8th

[REGISTER TODAY](#)

<https://nehers.org/hers-rater-trainings>

The graphic features a background of colorful, flowing waves in shades of pink, purple, and blue. The NEHERS logo is at the top, followed by the title 'HERS RATER TRAINING' in large, bold letters. Below the title, the dates and trainer information are listed. A prominent announcement about the scholarship deadline extension is shown in bold. A 'REGISTER TODAY' link is provided in red text. The URL for more information is at the bottom of the graphic.

Audience Reminders:

- Participating in listen-only mode
- Submit a question by typing it into the Questions Pane at the right of your screen any time
- Download the Handout from the Handout Pane
- Provide feedback through our electronic survey following the webinar.
- The recording of this webinar will be posted on our website by Friday. <https://nehers.org/webinars>



Speakers:



Nick Falkoff
Principal
Auburndale Builders
nick@auburndalebuilders.com



Andrew Popielarski
Senior Home Energy Rater
Home Energy Raters
andrew@energycodehelp.com



Bob Ryley
Director of Construction
Habitat for Humanity
of Cape Cod
bobryley@habitatcapecod.org



SERIES OVERVIEW

- ~~11/30~~ ~~Session 1: Overview Home Performance Summary~~
- ~~12/7~~ ~~Session 2: Orientation, Windows and Doors, and PV~~
- ~~12/14~~ ~~Session 3: Mechanicals, Ventilation, Envelope and Appliances~~
- 12/21 Session 4: Review/Summary and Questions



SESSION FOUR

Agenda:

- Review / Summary
- Recipes for Success
- Questions



Recap Major Dials and Options/Considerations:



ORIENTATION



WINDOWS/DOORS



PV



MECHANICALS



INSULATION



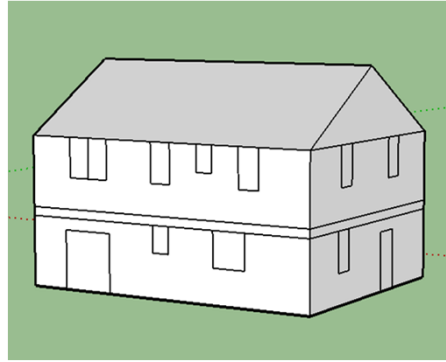
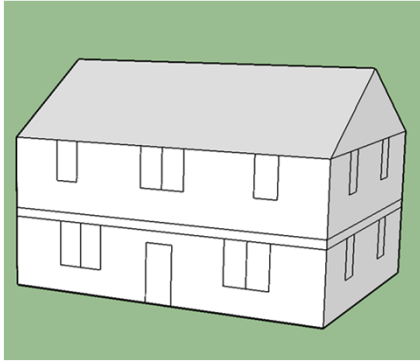
APPLIANCES



Generic Model Sketchup:



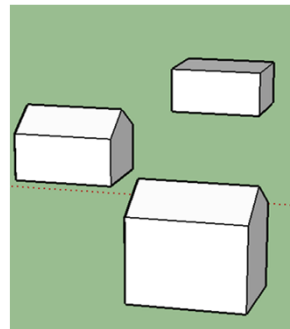
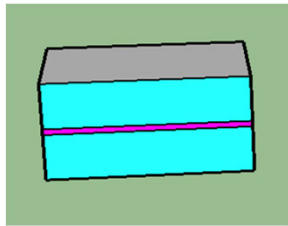
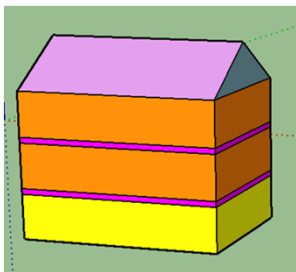
Elevation View for Determining Window Sizes and Alignment



AUBURNDALE BUILDERS HIGH PERFORMANCE HOMES | HOME ENERGY RATERS BUILDING PERFORMANCE TESTING | Cape Cod | NEHERS NORTHEAST HOME ENERGY RATING SYSTEM ALLIANCE | 25th Anniversary | 11

Source: AP 5-1-23

Identical Home with Different Insulation Options



AUBURNDALE BUILDERS HIGH PERFORMANCE HOMES | HOME ENERGY RATERS BUILDING PERFORMANCE TESTING | Cape Cod | NEHERS NORTHEAST HOME ENERGY RATING SYSTEM ALLIANCE | 25th Anniversary | 12

Source: AP 5-1-23

Chart of Differences

Type of Construction

- Electric – Insulated on Flat Ceiling with Unconditioned Basement
- Electric – Insulated on Flat Ceiling with Conditioned Basement
- Electric with Spray Foam Ceiling with Unconditioned Basement
- Electric with Spray Foam Ceiling with Conditioned Basement
- Gas with Double Pane Windows and Solar
- Gas with Triple Pane Windows (NO Solar)
- Gas with Spray Foam Ceiling, Conditioned Basement and Triple Pane Windows (NO Solar)



Source: AP 5-1-23

Electric – Insulated on Flat Ceiling with Unconditioned Basement

Building Specification Summary

Property Norwell, MA 02061 SF Template - Nick F. Class - Flat w/ uncond base	Organization Home Energy Raters Chris Mazzola 508-833-3100 Builder	Inspection Status Results are projected
Building Information	Rating	
Conditioned Area [ft ²]	2,016.00	HERS Index 45
Conditioned Volume [ft ³]	17,136.00	HERS Index w/o PV 45
Thermal Boundary Area [ft ²]	4,192.00	
Number Of Bedrooms	3	
Housing Type	Single family detached	
Building Shell		
Ceiling w/ Attic	R52,CE,14",4x24,G1; U-0.019	Windows (largest)
Vaulted Ceiling	None	U-Value: 0.27, SHGC: 0.43
Above Grade Walls	R21,FG,6x16,G1; U-0.057	Window / Wall Ratio
Found. Walls	None	0.14
Framed Floors	R30,FG,10x16,G1; R-30	Infiltration
Slabs	None	1.3 ACH50
		Duct Lkg to Outside
		80 CFM @ 25Pa (3.97 / 100 ft ²)
		Total Duct Leakage
		80 CFM @ 25Pa (Post-Construction)
Mechanical Systems		
Heating	Air Source Heat Pump • Electric • 11.6 HSPF	
Cooling	Air Source Heat Pump • Electric • 21 SEER	
Water Heating	Residential Water Heater • Electric • 3.75 UEF	
Programmable Thermostat	Yes	
Ventilation System	80 CFM • 50 Watts • ERV	
Whole House Fan	N/A	



Source: AP 5-1-23

Electric - Insulated on Flat Ceiling with Conditioned Basement

Building Specification Summary

Property
 Norwell, MA 02061

Organization
 Home Energy Raters
 Chris Mazzola
 508-833-3100

Inspection Status
 Results are projected

SF Template - Nick F. Class -
 Flat w/ cond base

Builder

Building Information

Conditioned Area [ft²] 2,016.00

Conditioned Volume [ft³] 28,208.00

Thermal Boundary Area [ft²] 5,344.00

Number Of Bedrooms 3

Housing Type Single family detached

Rating

HERS Index 45

HERS Index w/o PV 45

Building Shell

Ceiling w/ Attic R52,CE,14",4x24,G1; U-0.019

Vaulted Ceiling None

Above Grade Walls R21,FG,6x16,G1; U-0.057

Found. Walls R15,HDF,2.25",Continuous; R-15

Framed Floors None

Slabs Uninsulated; R-0

Windows (largest) U-Value: 0.27, SHGC: 0.43

Window / Wall Ratio 0.15

Infiltration 1.2 ACH50

Duct Lkg to Outside 80 CFM @ 25Pa (3.97 / 100 ft²)

Total Duct Leakage 80 CFM @ 25Pa (Post-Construction)

Mechanical Systems

Heating Air Source Heat Pump • Electric • 11.6 HSPF

Cooling Air Source Heat Pump • Electric • 21 SEER

Water Heating Residential Water Heater • Electric • 3.75 UEF

Programmable Thermostat Yes

Ventilation System 80 CFM • 50 Watts • ERV

Whole House Fan N/A



Source: AP 5-1-23

Electric with Spray Foam Ceiling, Conditioned Basement

Building Specification Summary

Property
 Norwell, MA 02061

Organization
 Home Energy Raters
 Chris Mazzola
 508-833-3100

Inspection Status
 Results are projected

SF Template - Nick F. Class -
 Vaulted w/ cond base

Builder

Building Information

Conditioned Area [ft²] 2,016.00

Conditioned Volume [ft³] 30,240.00

Thermal Boundary Area [ft²] 5,497.00

Number Of Bedrooms 3

Housing Type Single family detached

Rating

HERS Index 45

HERS Index w/o PV 45

Building Shell

Ceiling w/ Attic None

Vaulted Ceiling R50,HDF+LDF,2"x10",10x16,G1,C,Unfinished; U-0.023

Above Grade Walls R21,FG,6x16,G1; U-0.057

Found. Walls R15,HDF,2.25",Continuous; R-15

Framed Floors None

Slabs Uninsulated; R-0

Windows (largest) U-Value: 0.27, SHGC: 0.43

Window / Wall Ratio 0.15

Infiltration 0.9 ACH50

Duct Lkg to Outside 80 CFM @ 25Pa (3.97 / 100 ft²)

Total Duct Leakage 80 CFM @ 25Pa (Post-Construction)

Mechanical Systems

Heating Air Source Heat Pump • Electric • 11.6 HSPF

Cooling Air Source Heat Pump • Electric • 21 SEER

Water Heating Residential Water Heater • Electric • 3.75 UEF

Programmable Thermostat Yes

Ventilation System 80 CFM • 50 Watts • ERV

Whole House Fan N/A



Source: AP 5-1-23

Electric with Spray Foam Ceiling, Unconditioned Basement

Building Specification Summary

Property
Norwell, MA 02061
SF Template - Nick F. Class - Vaulted w/ uncond base

Organization
Home Energy Raters
Chris Mazzola
508-833-3100

Inspection Status
Results are projected

Building Information		Rating	
Conditioned Area [ft ²]	2,016.00	HERS Index	45
Conditioned Volume [ft ³]	21,168.00	HERS Index w/o PV	45
Thermal Boundary Area [ft ²]	4,569.00		
Number Of Bedrooms	3		
Housing Type	Single family detached		

Building Shell		Rating	
Ceiling w/ Attic	None	Windows (largest)	U-Value: 0.27, SHGC: 0.43
Vaulted Ceiling	R50 MFC, LDF, 2x10, 10x16, G1, U=0.023	Window / Wall Ratio	0.13
Above Grade Walls	R21, FG, 6x16, G1; U=0.057	Infiltration	1 ACH50
Found. Walls	None	Duct Lkg to Outside	80 CFM @ 25Pa (3.97 / 100 ft ²)
Framed Floors	R30, FG, 10x16, G1; R-30	Total Duct Leakage	80 CFM @ 25Pa (Post-Construction)
Slabs	None		

Mechanical Systems	
Heating	Air Source Heat Pump • Electric • 11.6 HSPF
Cooling	Air Source Heat Pump • Electric • 21 SEER
Water Heating	Residential Water Heater • Electric • 3.75 UEF
Programmable Thermostat	Yes
Ventilation System	80 CFM • 50 Watts • ERV
Whole House Fan	N/A

Source: AP 5-1-23

Gas with Double Pane Windows and Solar

Building Specification Summary

Property
Norwell, MA 02061
SF Template - Nick F. Class - Flat w/ uncond base - GAS w/ double+solar

Organization
Home Energy Raters
Chris Mazzola
508-833-3100

Inspection Status
Results are projected

Building Information		Rating	
Conditioned Area [ft ²]	2,016.00	HERS Index	45
Conditioned Volume [ft ³]	17,136.00	HERS Index w/o PV	45
Thermal Boundary Area [ft ²]	4,192.00		
Number Of Bedrooms	3		
Housing Type	Single family detached		

Building Shell		Rating	
Ceiling w/ Attic	R59, CE, 16", 4x24, G1; U=0.017	Windows (largest)	U-Value: 0.27, SHGC: 0.3
Vaulted Ceiling	None	Window / Wall Ratio	0.14
Above Grade Walls	R21, FG, 6x16, G1; U=0.057	Infiltration	0.8 ACH50 !!!
Found. Walls	None	Duct Lkg to Outside	80 CFM @ 25Pa (3.97 / 100 ft ²)
Framed Floors	R30, FG, 10x16, G1; R-30	Total Duct Leakage	80 CFM @ 25Pa (Post-Construction)
Slabs	None		

Mechanical Systems	
Heating	Furnace • Natural Gas • 96.5 AFUE
Cooling	Air Conditioner • Electric • 15 SEER
Water Heating	Residential Water Heater • Natural Gas • 0.95 UEF
Programmable Thermostat	Yes
Ventilation System	83 CFM • 50 Watts • ERV
Whole House Fan	N/A

Source: AP 5-1-23

Gas with Triple Pane Windows (NO Solar)

Building Specification Summary

Property	Organization	Inspection Status
Norwell, MA 02061	Home Energy Raters Chris Mazzola 508-833-3100	Results are projected
SF Template - Nick F. Class - Flat w/ uncond base - GAS w/triple		
Builder		
Building Information		Rating
Conditioned Area [ft ²]	2,016.00	HERS Index 42
Conditioned Volume [ft ³]	17,136.00	HERS Index w/o PV 42
Thermal Boundary Area [ft ²]	4,192.00	
Number Of Bedrooms	3	
Housing Type	Single family detached	
Building Shell		
Ceiling w/ Attic	R59,CE,16",4x24,G1; U-0.017	Windows (largest) U-Value: 0.19, SHGC: 0.42
Vaulted Ceiling	None	Window / Wall Ratio 0.14
Above Grade Walls	R21,FG,6x16,G1; U-0.057	Infiltration 0.8 ACH50
Found. Walls	None	Duct Lkg to Outside 80 CFM @ 25Pa (3.97 / 100 ft ²)
Framed Floors	R30,FG,10x16,G1; R-30	Total Duct Leakage 80 CFM @ 25Pa (Post-Construction)
Slabs	None	
Mechanical Systems		
Heating	Furnace • Natural Gas • 96.5 AFUE	
Cooling	Air Conditioner • Electric • 15 SEER	
Water Heating	Residential Water Heater • Natural Gas • 0.95 UEF	
Programmable Thermostat	Yes	
Ventilation System	83 CFM • 50 Watts • ERV	
Whole House Fan	N/A	



Source: AP 5-1-23

Gas with Spray Foam Ceiling, Conditioned Basement and Triple Pane Windows (NO Solar)

Building Specification Summary

Property	Organization	Inspection Status
Norwell, MA 02061	Home Energy Raters Chris Mazzola 508-833-3100	Results are projected
SF Template - Nick F. Class - Vaulted w/ cond base - GAS w/triple		
Builder		
Building Information		Rating
Conditioned Area [ft ²]	2,016.00	HERS Index 42
Conditioned Volume [ft ³]	30,240.00	HERS Index w/o PV 42
Thermal Boundary Area [ft ²]	5,497.00	
Number Of Bedrooms	3	
Housing Type	Single family detached	
Building Shell		
Ceiling w/ Attic	None	Windows (largest) U-Value: 0.19, SHGC: 0.42
Vaulted Ceiling	None	Window / Wall Ratio 0.15
Above Grade Walls	R50,HDF+LDF,2"x10",10x16,G1 C,Unfinished; U-0.023	Infiltration 0.9 ACH50
Found. Walls	R20,HDF,3",Continuous; R-20	Duct Lkg to Outside 80 CFM @ 25Pa (3.97 / 100 ft ²)
Framed Floors	None	Total Duct Leakage 80 CFM @ 25Pa (Post-Construction)
Slabs	Uninsulated; R-0	
Mechanical Systems		
Heating	Furnace • Natural Gas • 96.5 AFUE	
Cooling	Air Conditioner • Electric • 15 SEER	
Water Heating	Residential Water Heater • Natural Gas • 0.96 UEF	
Programmable Thermostat	Yes	
Ventilation System	80 CFM • 50 Watts • ERV	
Whole House Fan	N/A	



Source: AP 5-1-23

Exception to Rule is Tons of Glass



Design Stages:

- 1) Concept- Layout
- 2) Schematic Design (SD)
- 3) Design Development (DD)
- 4) Construction Drawings (CD)

Construction Stages:

- 5) Foundation and Frame
- 6) Envelope: Insulation (Interior/Exterior)
- 7) MEP
- 8) Finishes Interior/Exterior



Recommended Workflow to Reduce Risks

Recommended Workflow for 42/45:

- 1) More check-ins, earlier in **SD/DD/CD *design phases*** before you get to construction.
- 2) Keep value engineering options open. Do not design your team into a corner that could require expensive corrections to reach your HERS Score.
- 3) Focus on: high efficiency heating/cooling, DHW, ERV/HRV, and windows- making the right decisions with these four items makes the biggest impact on overall HERS rating.
- 4) Allows builder/architect to play with insulation type and level, which home-owner may not have preferences about.
- 5) Once you have this formula down, you can repeat it for similar builds, or go through it step-by-step each time for custom builds.



Recipes for Success:



Questions and Answers:



Nick Falkoff
Principal
Auburndale Builders
nick@auburndalebuilders.com



Andrew Popielarski
Senior Home Energy Rater
Home Energy Raters
andrew@energycodehelp.com



Bob Ryley
Director of Construction
Habitat for Humanity
of Cape Cod
bobryley@habitatcapecod.org

Please type your questions into the Questions Pane.



Thank You for Participating in Today's Webinar

Please take a moment to complete the brief survey.
Your feedback is very important to us.

Upcoming NEHERS Monthly Webinar Series:

January TBD: Solving Performance Demands with Wood Fiber Insulation

– with Scott Johnston of Timber HP

February 14, 2024: PHIUS Prescriptive Path

– with Isaac Elnecave and Tony Lisanti of PHIUS

<https://nehers.org/webinars>

