Home Energy Rating Certificate

Property
Well House
537 Woodlawn St SE
Grand Rapids, MI 49507

HERS
Rating Type: Confirmed
Rating Date: 11/15/2017
Registry ID: 528591246

Certified Energy Rater: Jamison Lenz
Rating Number:

HERS Index: 62

General Information

Conditioned Area	1055 sq. ft.	House Type	Single-family detached
Conditioned Volume	14601 cubic ft.	Foundation	Unconditioned basement
Bedrooms	4		

Mechanical Systems Features

Heating:	Fuel-fired air distribution, Natural gas, 96.0 AFUE.
Water Heating:	Heat pump, Electric, 3.24 EF, 50.0 Gal.
Duct Leakage to Outside	38.00 CFM25.
Ventilation System	Balanced: ERV, 135 cfm, 115.0 watts.
Programmable Thermostat	Heat=Yes; Cool=Yes

Building Shell Features

Ceiling Flat	R-50.0	Slab	None
Sealed Attic	NA	Exposed Floor	R-0.0
Vaulted Ceiling	NA	Window Type	U-Value: 0.220, SHGC: 0.320
Above Grade Walls	R-13.6	Infiltration Rate	Htg: 1483 Clg: 1483 CFM50
Foundation Walls	R-10.0	Method	Blower door test

Lights and Appliance Features

Percent Interior Lighting	100.00	Range/Oven Fuel	Natural gas
Percent Exterior Lighting	100.00	Clothes Dryer Fuel	Natural gas
Refrigerator (kWh/yr)	387	Clothes Dryer CEF	2.32
Dishwasher Energy Factor	0.46	Ceiling Fan (cfm/Watt)	0.00

Estimated Annual Energy Cost

Use	MMBtu	Cost	Percent
Heating	52.5	$498	42%
Cooling	0	$0	0%
Hot Water	3.0	$97	8%
Lights/Appliances	17.3	$448	38%
Photovoltaics	-0.0	$-0	-0%
Service Charges		$150	13%
Total	**72.8**	**$1192**	**100%**

Criteria

This home meets or exceeds the minimum criteria for the following:

Jamison Lenz
Catalyst Partners
502 Second St Ste 200
Grand Rapids, MI 49504
616-454-1111
Fax #

LEED for HOMES

Property
Well House
537 Woodlawn St SE
Grand Rapids, MI 49507

Weather:Grand Rapids, MI
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This home uses 48% less energy than the LEED Reference Home.

Source Energy Consumption(MMBtu/yr)

	LEED Reference	As Designed
Heating	92.4	56.6
Cooling	11.4	3.2
Water Heating	46.0	9.6
Lights & Appliances	74.4	45.1
Photovoltaics	0.0	0.0
Total	224.2	114.5

This home MEETS the requirements for designation as an EPA ENERGY STAR Qualified Home under version 2.0/2.5/3.0.

Design consumption is based on the following dominant features:

- Number of Bedrooms: 4
- Ceiling Flat: R-50.0
- Vaulted Ceiling: NA
- Sealed Ceiling: NA
- Above Grade Walls: R-13.6
- Foundation Walls: R-10.0
- Exposed Floor: R-0.0
- Slab: NA
- Window Type: U-Value: 0.22, SHGC: 0.32
- Infiltration: Blower door test Htg: 1483 Clg: 1483 CFM50
- Heating: Fuel-fired air distribution, Natural gas, 96.0 AFUE.
- Cooling: N/A
- Water Heating: Heat pump, Electric, 3.24 EF, 50.0 Gal.
- Duct Leakage to Outside: 38.00 CFM25.
- Ventilation System: Balanced: ERV, 135 cfm, 115.0 watts.
- Programmable Thermostat: Heat=Yes; Cool=Yes

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Property/Builder Information

Building Name	537 Woodlawn
Owner's Name	Well House
Property Address	537 Woodlawn St SE
City, St, Zip	Grand Rapids, MI 49507
Phone Number	(616) 245-3910
Builder's Name	Well House
Phone Number	616-245-3910
Email Address	travis@wellhousegr.org
Plan/Model Name	
Community/Development	
Permit Date/Number	

Organization Information

Organization Name	Catalyst Partners
Address	502 Second St
City, St, Zip	Grand Rapids, MI 49504
Phone Number	616-454-1111
Website	

Rating/RESNET Information

Provider ID	1998-146
Sample Set ID	00000000
Registry ID	528591246
Registry Date Registered	11/15/2017
Rater's Name	Jamison Lenz
Rater's ID	3892781
Rater's Email	
Last Field Insp	11/15/2017
Rating Type	Confirmed
Reason for Rating	Home Improvement
Rating Number	

Building Summary

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Builder
Well House

General Building Information

Area of Conditioned. Space(sq ft)	1055
Volume of Conditioned. Space	14601
Year Built	2017
Housing Type	Single-family detached
Level Type(Apartments Only)	None
Floors on or Above-Grade	1
Number of Bedrooms	4
Foundation Type	Unconditioned basement
Enclosed Crawl Space Type	N/A
Number of Stories Including Conditioned Basement	1
Thermal Boundary Location	REM Default

Foundation Wall Information

Name	Library Entry	Location	Length(ft)	Total Height(ft)	Depth Below Grade(ft)	Height Above Grade(ft)	Uo Value Combo*	Uo Value (wall only)
Foundattion Wall	R-10 ******	Uncond bsmt->amb/grnd	167.0	7.0	6.0	1.0	0.064	0.098

* Uo Value Combo combines wall, airfilm, and soil path

Foundation Wall Library List

Foundation Wall: R-10 ******

Type	Solid concrete or stone
Thickness(in)	2.5
Studs	None
Interior Insulation	
Continuous R-Value	10.0
Frame Cavity R-Value	0.0
Cavity Insulation Grade	1
Ins top	0.0 ft from top of wall
Ins Bottom	0.0 ft from bottom of wall
Exterior Insulation	
R-Value	0.0
Ins top	0.0 ft from top of wall

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Foundation Wall Library List

Ins bottom	0.0 ft below grade
Note	

Frame Floor Information

Name	Library Entry	Location	Area(sq ft)	Uo Value
Uninsulated Floor	Uninsulated******	Btwn cond & uncond bsmt	1055	0.292

Frame Floor Library List

Floor: Uninsulated******

Information From Quick Fill Screen	
Continous Insulation R-Value	0.0
Cavity Insulation R-Value	0.0
Cavity Insulation Thickness (in.)	0.0
Cavity Insulation Grade	3
Joist Size (w x h, in)	1.5 x 9.5
Joist Spacing (in oc)	16.0
Framing Factor - (default)	0.1300
Floor Covering	CARPET
Note	

Rim and Band Joist Information

Name	Location	Area(sq ft)	Continuous Ins	Framed Cavity Ins	Cavity Ins Thk(in)	Joist Spacing	Insulation Grade	Uo Value
Rim 1	Cond -> ambient	167.00	0.0	19.5	3.0	16.0	1	0.057

Above-Grade Wall

Name	Library Entry	Location	Exterior Color	Area(sq ft)	Uo Value
AGW 1	R-12.6, R-1Cont.*******	Cond -> ambient	Medium	1336.00	0.079

Above-Grade Wall Library List

Above-Grade Wall: R-12.6, R-1Cont.*******

Information From Quick Fill Screen

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Builder
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Above-Grade Wall Library List

Wall Construction Type	Standard Wood Frame
Continuous Insulation (R-Value)	1.0
Frame Cavity Insulation (R-Value)	12.6
Frame Cavity Insulation Thickness (in)	3.5
Frame Cavity Insulation Grade	1
Stud Size (w x d, in)	1.5 x 3.5
Stud Spacing (in o.c.)	16.0
Framing Factor - (default)	0.2300
Gypsum Thickness (in)	0.5
Note	

Window Information

						Overhang			Interior		Adjacent	
Name	Wall Assignment	Orient	U-Value	SHGC	Area (sqft)	Depth (ft)	To Top (ft)	To Btm (ft)	Winter Shading	Summer Shading	Winter Shading	Summer Shading
North	AGWall 1	North	0.220	0.320	12.50	0.0	0.0	0.0	0.85	0.70	Some	Some
South	AGWall 1	South	0.220	0.320	18.00	0.0	0.0	0.0	0.85	0.70	None	None
West	AGWall 1	West	0.220	0.320	58.50	0.0	0.0	0.0	0.85	0.70	Some	Some
East	AGWall 1	East	0.220	0.320	44.00	0.0	0.0	0.0	0.85	0.70	Some	Some

Door Information

Name	Library Entry	Wall Assignment	Opaque Area(sq ft)	Uo Value	R-Value of Opaque Area	Storm Door
Doors	Steel-urth w/brk*******	AGWall 1	40.0	0.168	5.0	No

Roof Information

Name	Library Entry	Ceiling Area(sq ft)	Roof Area(sq ft)	Exterior Color	Radiant Barrier	Type	Uo Value	Cement or Clay Tiles	Roof Tile Ventilation
Rafter Ceiling	R-50 Blown, Attic**********	1055.00	1318.75	Medium	No	Attic	0.020	No	No

Roof Library List

Ceiling: R-50 Blown, Attic**********

Information From Quick Fill Screen

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Roof Library List

Continous Insulation (R-Value)	37.0
Cavity Insulation (R-Value)	13.0
Cavity Insulation Thickness (in)	3.5
Cavity Insulation Grade	1
Gypsum Thickness (in)	0.500
Insulated Framing Size(w x h, in)	1.5 x 3.5
Insulated Framing Spacing (in o.c.)	24.0
Framing Factor - (default)	0.1100
Ceiling Type	Attic
Note	

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Mechanical Equipment

Number of Mechanical Systems	2
Heating SetPoint(F)	68.00
Heating Setback Thermostat	Present
Cooling SetPoint(F)	78.00
Cooling Setup Thermostat	Present

Heat: 96AFUE Gas Furn 26k******

SystemType	Fuel-fired air distribution
Fuel Type	Natural gas
Rated Output Capacity (kBtuh)	26.0
Seasonal Equipment Efficiency	96.0 AFUE
Auxiliary Electric	139 Eae
Note	
Number Of Units	1
Location	Uncond bsmnt/enclosed crawl
Performance Adjustment	100
Percent Load Served	100

DHW: 50 Gallon Heat Pump******

Water Heater Type	Heat pump
Fuel Type	Electric
Energy Factor	3.24
Recovery Efficiency	0.00
Water Tank Size (gallons)	50
Extra Tank Insulation (R-Value)	0.0
Note	
Number Of Units	1
Location	Uncond bsmnt/enclosed crawl
Performance Adjustment	100
Percent Load Served	100

DHW Efficiencies

All bath faucets & showers <= 2gpm	true

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DHW Efficiencies

All DHW pipes fully insulated >= R-3	true
Recirculation type	None (standard system)
Farthest fixture to DHW heater	20
TOTAL Pipelength for longest DHW run	35
DWHR unit present?	false

DHW Diagnostics	
dhwGpd	48.91
peRatio	0.44
dishwasherGpd	5.10
clothesWasherHotWaterGPD	-0.09
EDeff	0.90
ewaste	16.65
tmains	53.90
dwhrWhInletTempAdj	0.00
pumpConsKwh	0.00
pumpConsMmbtu	0.00

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Duct Systems

Name	**Duct work**
Conditioned Floor Area(sq ft)	1055.0
# of Returns	5
Heating System	96AFUE Gas Furn 26k******
Cooling System	N/A
Supply Duct Surface Area(sq ft)	284.9
Return Duct Surface Area(sq ft)	263.8
Duct Leakage	
Qualitative Assessment	Not Applicable
Duct Leakage to Outside	
Supply+Return	38.00 CFM @ 25 Pascals
Supply Only	Not Applicable
Return Only	Not Applicable
Total Duct Leakage	125.00 CFM @ 25 Pascals
Duct Tightness Test	Postconstruction Test

Type	**Location**	**Percent Location**	**R-Value**
Supply	Unconditioned basement	100.0	0.0
Return	Unconditioned basement	100.0	0.0

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Builder
Well House

Infiltration and Mechanical Ventilation

Whole House Infiltration

Measurement Type	Blower door test
Heating Season Infiltration Value	1483 CFM @ 50 Pascals
Cooling Season Infiltration Value	1483 CFM @ 50 Pascals
Shelter Class	4
Code Verification	Tested

Mechanical Ventilation for IAQ

Type	Balanced
Rate(cfm)	135
Sensible Recovery Efficiency(%)	80.00
Total Recovery Efficiency(%)	73.00
Hours per Day	17.0
Fan Power (watts)	115.00
ECM Fan Motor	true

Ventilation Strategy for Cooling

Cooling Season Ventilation	Natural Ventilation

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Builder
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Lights and Appliances

Rating/RESNET audit	
Ceiling Fan CFM / Watt	0.00
Refrigerator kWh/yr	387
Refrigerator Location	Conditioned
Range/Oven Fuel Type	Natural gas
Induction Range	No
Convection Oven	No
Dishwasher	
Energy Factor	0.46
Dishwasher kWh/yr	0
Place Setting Capacity	12
Clothes Dryer	
Fuel Type	Natural gas
Location	Conditioned
Moisture Sensing	Yes
CEF	2.32
Clothes Washer	
Location	Conditioned
LER (kWh/yr)	96
IMEF	3.060
Capacity (CU.Ft)	3.810
Electricity Rate	0.11
Gas Rate	1.22
Annual Gas Cost	11.00
Qualifying Light Fixtures	
Interior CFLs %	100.0
Interior Fluorescent %	0.0
Exterior Lights %	100.0
Garage Lights %	0.0

Building Summary

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Mandatory Requirements

IECC Requirements	
Verified IECC 04	false
Verified IECC 06	false
Verified IECC 09	false
Verified IECC 12	false
Verified IECC 15	false
Verified NY-ECCC 2016	false
Verified IECC MI	false
EPA Requirements	
Rater certifies that the home complies with the following requirements for:	ENERGY STAR V 3.1
Rater Design Review Checklist	
Rater Field Checklist	
HVAC Design Report	
HVAC Commissioning Checklist (optional)	

ENERGY STAR Version 3 Appliances	Amount
Refrigerators	1
Ceiling Fans	1
Exhaust Fans	1
Dishwashers	1

ENERGY STAR Version 3 Basements	
Basement Wall Area 50% Below Grad:	false
Basement Floor Area	0.00
2009 IECC Prescriptive Requirements for ENERGY STAR v3.0	false
Slab Insulation Exemption:	true
Indoor airPlus Verification Checklist	false
EPA Field App ID	

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DOE Zero Energy Ready Home

Home Builder ID Number

Mandatory Requirements	
Verified Fenestration	false
Verified Insulation	false
Verified Duct Location	false
Verified Appliance	false
Verified Lighting	false
Verified Fan Efficiency	false
Verified Water Efficiency	false
Verified EPA Indoor airPLUS	false
Verified Renewable Energy Ready Solar Electric	false
Optional Home Builder Commitments for Recognition	
Certified under the EPA WaterSense for New Homes Program	No
Certified under the IBHS fortified for Safer Living Program	No
Followed the DOE Zero Energy Ready Home Quality Management Guidelines	No
The buyer of this home signed a waiver giving DOE Zero Energy Ready Home access to utility bill data for one year.	No

Active Solar

System Type	None
Collector Loop Type	None
Collector Type	None
Collector Orientation	None
Area(sq ft)	0.0
Tilt(degrees)	0.0
Volume(cu ft/gal)	0.0

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Notes

GL 11/17/17 QA Notes: Print Permissions re-enabled for this HERS rating file.

"The only change I made was grading the attic insulation to Grade I from Grade III"

DS 11-15-17 QA Comments: Print permissions enabled after rater change for this HERS rating.

BT 11-15-17 QA Comments: Please see QA comments below, make corrections and resubmit. Thanks

-Full builder information with at least 1 point of contact is required for all confirmed ratings.

-The volume entered would put the ceiling height at almost 14'. Are you adding in the unconditioned basement into your calculations? Please correct before resubmitting.

Yes, I'm adding in the unconditioned basement for infilration volume, Chris told me to do this.

ENERGY STAR v3.1 Home Verification Summary

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Builder
Well House

Building Information

Conditioned Area (sq ft)	1055
Conditioned Volume (cubic ft)	14601
Insulated Shell Area (sq ft)	3727
Number of Bedrooms	4
Housing Type	Single-family detached
Foundation Type	Unconditioned basement

Rating

HERS Index	62
HERS Index w/o PV	62
HERS Index Target (SAF Adjusted)	70
HERS Index of Reference Design Home	70
Size Adjustment Factor	1.00

This home MEETS OR EXCEEDS the EPA's requirements for an ENERGY STAR Home.
HERS Index w/o PV <= HERS Index of Reference Design Home AND HERS Index <= HERS Index Target to comply.

Building Shell

Ceiling w/Attic	R-50 Blown, Attic********* U=0.020	Window Type	Dbl/LoE/Arg - Vinyl3**********
Sealed Attic	None	Window	U-Value: 0.220, SHGC: 0.320
Vaulted Ceiling	None	Window/Wall Ratio	0.10
Above Grade Walls	R-12.6, R-1Cont.******* U=0.079	Infiltration Type	Blower door test
Found. Walls(Cond)	None	Infiltration	Htg: 1483 Clg: 1483 CFM50
Found. Walls(Uncond)	R-10 ****** R=10.0	Duct Leakage to Outside	38.00 CFM @ 25 Pascals
Floors	Uninsulated****** U=0.292	Total Duct Leakage	125.00 CFM @ 25 Pascals
Slab Floors	None		

Mechanical Systems

Heating	Fuel-fired air distribution, 26.0 kBtuh, 96.0 AFUE.
Water Heating	Heat pump, Elec, 3.24 EF.
Programmable Thermostat	Heat=Yes; Cool=Yes
Ventilation System	Balanced: ERV, 135 cfm, 115.0 watts.

Lights and Appliances

Percent Interior Lighting	100.00	Clothes Dryer Fuel	Natural gas
Percent Exterior Lighting	100.00	Clothes Dryer CEF	2.32
Refrigerator (kWh/yr)	387.00	Clothes Washer LER	96.00
Dishwasher Energy Factor	0.46	Clothes Washer Capacity	3.81
Ceiling Fan (cfm/Watt):	0.00	Range/Oven Fuel	Natural gas

Note: Where feature level varies in home, the dominant value is shown.

ENERGY STAR® CERTIFIED NEW HOME

Builder Name: Well House
Permit Date/Number:
Home Address: 537 Woodlawn St SE
Grand Rapids, MI 49507

Rating Company: Catalyst Partners
Rater Identification Number: 3892781
Rating Date: 11/15/2017
Version: 3.1

Standard Features of an ENERGY STAR Certified New Home

Your ENERGY STAR certified new home has been designed, constructed, and independently verified to meet rigorous requirements for energy efficiency set by the U.S. Environmental Protection Agency (EPA), including:

Thermal Enclosure System

A complete thermal enclosure system that includes comprehensive air sealing, quality-installed insulation and high-performing windows to deliver improved comfort and lower utility bills.

Air Infiltration Test: **Htg: 1483 Clg: 1483 CFM50**

Primary Insulation Levels:

Ceiling: R-50.0	**FndWall: R-10.0**
AGWall: R-13.6	**Floor: R-0.0**

Primary Window Efficiency:
U-Value: 0.220, SHGC: 0.320

Water Management System

A comprehensive water management system to protect roofs, walls, and foundations.

Flashing, a drainage plane, and site grading to move water from the roof to the ground and then away from the home.

Water-resistant materials on below-grade walls and underneath slabs to reduce the potential for water entering into the home.

Management of moisture levels in building materials during construction.

Heating, Cooling, and Ventilation System

A high-efficiency heating, cooling system, and ventilation system that is designed and installed for optimal performance.

Total Duct Leakage:
125.00 CFM25.

Duct Leakage to Outdoors:
38.00 CFM25.

Primary Heating (System Type • Fuel Type • Efficiency):
Fuel-fired air distribution, Natural gas, 96.0 AFUE.

Primary Cooling (System Type • Fuel Type • Efficiency):
None

Energy Efficient Lighting and Appliances

Energy efficient products to help reduce utility bills, while providing high-quality performance.

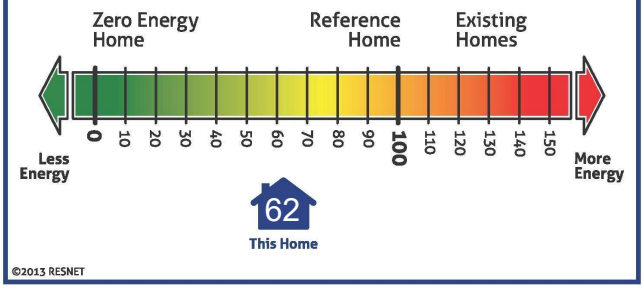
ENERGY STAR Qualified Lighting: **100%**

ENERGY STAR Qualified Appliances and Fans:

Refrigerators: 1	**Dishwashers: 1**
Ceiling Fans: 1	**Exhaust Fans: 1**

Primary Water Heater (System Type • Fuel Type • Efficiency):
Heat pump, Electric, 3.24 EF, 50.0 Gal.

HERS® Index



The certificate provides a summary of the major energy efficiency and other construction features that contribute to this home earning the ENERGY STAR, including its Home Energy Rating System(HERS) score, as determined through independent inspection and verification performed by a trained professional. The home Energy Rating System is a nationally-recognized uniform measurement of the energy efficiency of homes.

Note that when a home contains multiple performance levels for a particular feature (e.g., window efficiency or insulation levels), the predominant value is shown. Also, homes may be certified to earn the ENERGY STAR using a sampling protocol, whereby one home is randomly selected from a set of homes for representative inspections and testing. In such cases, the features found in each home within the set are intended to meet or exceed the values presented on this certificate. The actual values for your home may differ, but offer equivalent or better performance.

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Learn more at www.energystar.gov/homefeatures

Rater Field Checklist
ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 08)

Home Address: 537 Woodlawn SE City: Grand Rapids State: MI Permit Date: 5/8/17

Thermal Enclosure System	Must Correct	Builder Verified [1]	Rater Verified [2]	N/A [3]
1. High-Performance Fenestration & Insulation				
1.1 Fenestration meets or exceeds levels specified in Item 2.1 of the Rater Design Review Checklist		x	x	-
1.2 Insulation meets or exceeds levels specified in Item 3.1 of the Rater Design Review Checklist		x	x	-
1.3 All insulation achieves RESNET-defined Grade I installation. See Footnote 4 for alternatives. [4]		x	x	-
2. Fully-Aligned Air Barriers [5] At each insulated location below, a complete air barrier is provided that is fully aligned as follows:				
Ceilings: At interior or exterior horizontal surface of ceiling insulation in Climate Zones 1-3; at interior horizontal surface of ceiling insulation in Climate Zones 4-8. Also, at exterior vertical surface of ceiling insulation in all climate zones (e.g., using a wind baffle that extends to the full height of the insulation in every bay or a tabbed baffle in each bay with a soffit vent that prevents wind washing in adjacent bays).[6]				
2.1 Dropped ceilings / soffits below unconditioned attics, and all other ceilings			x	☐
Walls: At exterior vertical surface of wall insulation in all climate zones; also at interior vertical surface of wall insulation in Climate Zones 4-8 [7]				
2.2 Walls behind showers, tubs, staircases, and fireplaces			x	☐
2.3 Attic knee walls and skylight shaft walls [8]		—	—	☒
2.4 Walls adjoining porch roofs or garages				☒
2.5 Double-walls and all other exterior walls			x	-
Floors: At exterior vertical surface of floor insulation in all climate zones and, if over unconditioned space, also at interior horizontal surface including supports to ensure alignment. See Footnotes 10 & 11 for alternatives. [9, 10, 11]				
2.6 Floors above garages, floors above unconditioned basements or crawlspaces, and cantilevered floors				☒
2.7 All other floors adjoining unconditioned space (e.g., rim / band joists at exterior wall or at porch roof)			x	☐
3. Reduced Thermal Bridging				
3.1 For insulated ceilings with attic space above (i.e., non-cathedralized), Grade I insulation extends to the inside face of the exterior wall below and is ≥ R-21 in CZ 1-5; ≥ R-30 in CZ 6-8 [12]	☐	☐	☒	☐
3.2 For slabs on grade in CZ 4-8, 100% of slab edge insulated to ≥ R-5 at the depth specified by the 2009 IECC and aligned with the thermal boundary of the walls [13, 14]	☐	☐	☐	☒
3.3 Insulation beneath attic platforms (e.g., HVAC platforms, walkways) ≥ R-21 in CZ 1-5; ≥ R-30 in CZ 6-8		—	—	☒
3.4 At above-grade walls separating conditioned from unconditioned space, one of the following options used (rim / band joists exempted): [15]				
3.4.1 Continuous rigid insulation, insulated siding, or combination of the two is: ≥ R-3 in CZ 1-4; ≥ R-5 in CZ 5-8 [16, 17, 18], **OR**;	☐	☐	☐	☒
3.4.2 Structural Insulated Panels **OR**; Insulated Concrete Forms **OR**; Double-wall framing **OR**; [16,19]		—	—	☒
3.4.3 Advanced framing, including all of the Items below: [20]				
3.4.3a Corners insulated ≥ R-6 to edge [21], **AND**;	☐		x	☐
3.4.3b Headers above windows & doors insulated ≥ R-3 for 2x4 framing or equivalent cavity width, and ≥ R-5 for all other assemblies (e.g., with 2x6 framing) [22], **AND**;	☐	☐	☒	☐
3.4.3c Framing limited at all windows & doors to one pair of king studs, plus one pair of jack studs per window opening to support the header and sill, **AND**;	☐	☐	☒	☐
3.4.3d Interior / exterior wall intersections insulated to same R-value as rest of exterior wall, [23] **AND**;	☐		x	☐
3.4.3e Minimum stud spacing of 16 in. o.c. for 2x4 framing in all Climate Zones and, in CZ 6-8, 24 in. o.c. for 2x6 framing [24]	☐	☐	☒	☐
4. Air Sealing (Unless otherwise noted below, "sealed" indicates the use of caulk, foam, or equivalent material)				
4.1 Ducts, flues, shafts, plumbing, piping, wiring, exhaust fans, & other penetrations to unconditioned space sealed, with blocking / flashing as needed	☐	☐	☒	-
4.2 Recessed lighting fixtures adjacent to unconditioned space ICAT labeled and gasketed. Also, if in insulated ceiling without attic above, exterior surface of fixture insulated to ≥ R-10 in CZ 4-8.	☐	☐	☐	☒
4.3 Above-grade sill plates adjacent to conditioned space sealed to foundation or sub-floor. Gasket also placed beneath above-grade sill plate if resting atop concrete / masonry & adjacent to cond. space [25,26]	☐	☐	☐	☒
4.4 Continuous top plate or blocking is at top of walls adjoining unconditioned space, and sealed	☐		x	☐
4.5 Drywall sealed to top plate at all unconditioned attic / wall interfaces using caulk, foam, drywall adhesive (but not other construction adhesives), or equivalent material. Either apply sealant directly between drywall and top plate or to the seam between the two from the attic above.	☐	☐	☒	☐
4.6 Rough opening around windows & exterior doors sealed [27]	☐		x	-
4.7 Walls that separate attached garages from occupiable space sealed and, also, an air barrier installed and sealed at floor cavities aligned with these walls	☐	☐	☐	☒
4.8 In multifamily buildings, the gap between the common wall (e.g. the drywall shaft wall) and the structural framing between units sealed at all exterior boundaries	☐	☐	☐	☒
4.9 Doors adjacent to unconditioned space (e.g., attics, garages, basements) or ambient conditions made substantially air-tight with weatherstripping or equivalent gasket	☐	☐	☒x	☐
4.10 Attic access panels, drop-down stairs, & whole-house fans equipped with durable ≥ R-10 cover that is gasketed (i.e., not caulked). Fan covers either installed on house side or mechanically operated. [28]	☐	☐	☐	☒

Rater Field Checklist
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HVAC System [30] (HVAC Design Report Item # indicated in parenthesis)	Must Correct	Rater Verified [2]	N/A [3]
5. Heating & Cooling Equipment			
5.1 HVAC manufacturer & model number on installed equipment matches either of the following (check box): [31] ☒ HVAC Design Report (4.3, 4.4, & 4.17) ☐ Written approval received from designer	☐	☒	-
5.2 External static pressure measured by Rater at contractor-provided test locations and documented below: [32] Return-Side External Static Pressure: .37 IWC Supply-Side External Static Pressure: .12 IWC	☐	☒	☐
5.3 Permitted, but not required: HVAC Commissioning Checklist collected, with no items left blank	☐	☐	☒
6. Duct Quality Installation - *Applies to Heating, Cooling, Ventilation, Exhaust, & Pressure Balancing Ducts, Unless Noted in Footnote*			
6.1 Ductwork installed without kinks, sharp bends, compressions, or excessive coiled flexible ductwork [33]	☐	☒	☐
6.2 Bedrooms pressure-balanced using any combination of transfer grills, jump ducts, dedicated return ducts, and / or undercut doors to achieve a Rater-measured pressure differential ≤ 3 Pa with respect to the main body of the house when all bedroom doors are closed and all air handlers are operating. See Footnote 34 for alternative.[34]	☐	☒	-
6.3 All supply and return ducts in unconditioned space, including connections to trunk ducts, are insulated to ≥ R-6 [35]	☐	☐	☒
6.4 Rater-measured total duct leakage meets one of the following two options. See Footnote 37 for alternative: [36, 37, 38]			
6.4.1 Rough-in: The greater of ≤ 4 CFM25 per 100 sq. ft. of CFA or ≤ 40 CFM, with air handler & all ducts, building cavities used as ducts, & duct boots installed. In addition, all duct boots sealed to finished surface, Rater-verified at final. [39]	☐	☒	☐
6.4.2 Final: The greater of ≤ 8 CFM25 per 100 sq. ft. of CFA or ≤ 80 CFM, with the air handler & all ducts, building cavities used as ducts, duct boots, & register grilles atop the finished surface (e.g., drywall, floor) installed [40]	☐	☒	☐
6.5 Rater-measured duct leakage to outdoors the greater of ≤ 4 CFM25 per 100 sq. ft. of CFA or ≤ 40 CFM25 [36, 38, 41]	☐	☒	☐
7. Whole-House Mechanical Ventilation System			
7.1 Rater-measured ventilation rate is within either ± 15 CFM or ±15% of design value (2.3) [42]	☐	☒	-
7.2 A readily-accessible ventilation override control installed and also labeled if its function is not obvious (e.g., a label is required for a standalone wall switch, but not for a switch that's on the ventilation equipment)	☐	☒	-
7.3 No outdoor air intakes connected to return side of the HVAC system, unless controls are installed to operate intermittently & automatically based on a timer and to restrict intake when not in use (e.g., motorized damper)	☐	☒	-
7.4 System fan rated ≤ 3 sones if intermittent and ≤ 1 sone if continuous, or exempted [43]	☐	☒	-
7.5 If system utilizes the HVAC fan, then the specified fan type is ECM / ICM (4.7), or the controls will reduce the standalone ventilation run-time by accounting for hours when the HVAC system is heating or cooling	☐	☐	☒
7.6 Bathroom fans are ENERGY STAR certified if used as part of the whole-house system [44]	☐	☒	☐
7.7 Air inlet location (Complete if ventilation air inlet location was specified (2.12, 2.13); otherwise check "N/A"): [45, 46]	-	-	☐
7.7.1 Inlet pulls ventilation air directly from outdoors and not from attic, crawlspace, garage, or adjacent dwelling unit	☐	☒	-
7.7.2 Inlet is ≥ 2 ft. above grade or roof deck; ≥ 10 ft. of stretched-string distance from known contamination sources (e.g., stack, vent, exhaust, vehicles) not exiting the roof, and ≥ 3 ft. distance from sources exiting the roof	☐	☒	-
7.7.3 Inlet is provided with rodent / insect screen with ≤ 0.5 inch mesh	☐	☒	-

8. Local Mechanical Exhaust - In each kitchen and bathroom, a system is installed that exhausts directly to the outdoors and meets one of the following Rater-measured airflow and manufacturer-rated sound level standards: [42, 47]

Location		**Continuous Rate**	**Intermittent Rate** [48]			
8.1 Kitchen	Airflow	≥ 5 ACH, based on kitchen volume [49, 50]	≥ 100 CFM and, if not integrated with range, also ≥ 5 ACH based on kitchen volume [49, 50, 51]	☐	☒	-
	Sound	Recommended: ≤ 1 sone	Recommended: ≤ 3 sones			
8.2 Bathroom	Airflow	≥ 20 CFM	≥ 50 CFM	☐	☒	-
	Sound	Required: ≤ 1 sone	Recommended: ≤ 3 sones			

9. Filtration			
9.1 At least one MERV 6 or higher filter installed in each ducted mechanical system in a location that facilitates access and regular service by the owner [52]	☐	☒	☐
9.2 Filter access panel includes gasket or comparable sealing mechanism and fits snugly against the exposed edge of filter when closed to prevent bypass [53]	☐	☒	☐
9.3 All return air and mechanically supplied outdoor air passes through filter prior to conditioning	☐	☒	☐
10. Combustion Appliances			
10.1 Furnaces, boilers, and water heaters located within the home's pressure boundary are mechanically drafted or direct-vented. See Footnote 56 for alternatives. [54, 55, 56]	☐	☒	☐
10.2 Fireplaces located within the home's pressure boundary are mechanically drafted or direct-vented. See Footnote 57 for alternatives.[54, 55, 57]	☐	☐	☒
10.3 If unvented combustion appliances other than cooking ranges or ovens are located inside the home's pressure boundary, the Rater has followed Section 805 of RESNET's Standards, encompassing ANSI/ACCA 12 QH-2014, Appendix A, Section A3 (Carbon Monoxide Test), and verified the equipment meets the limits defined within [54, 58]	☐	☐	☒

Rater Name: Jamison M Lenz Rater Pre-Drywall Inspection Date: 7/26/17 Rater Initials: JML

Rater Name: Jamison M Lenz Rater Final Inspection Date: 11/14/17 Rater Initials: JML

Builder Employee: Travis VanLuyn Builder Inspection Date: 8/1/17 Builder Initials: TV

Water Management System Builder Requirements[1]
ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 08)

Builder Responsibilities:

- It is the exclusive responsibility of builders to ensure that each certified home is constructed to meet these requirements.
- While builders are not required to maintain documentation demonstrating compliance for each individual certified home, builders are required to develop a process to ensure compliance for each certified home (e.g., incorporate these requirements into the Scope of Work for relevant sub-contractors, require the site supervisor to inspect each home for these requirements, and / or sub-contract the verification of these requirements to a Rater).
- In the event that the EPA determines that a certified home was constructed without meeting these requirements, the home may be decertified.

1. Water-Managed Site and Foundation
1.1 Patio slabs, porch slabs, walks, and driveways sloped ≥ 0.25 in. per ft. away from home to edge of surface or 10 ft., whichever is less. [2]
1.2 Back-fill has been tamped and final grade sloped ≥ 0.5 in. per ft. away from home for ≥ 10 ft. See Footnote for alternatives. [2]
1.3 Capillary break beneath all slabs (e.g., slab on grade, basement slab) except crawlspace slabs using either: ≥ 6 mil polyethylene sheeting, lapped 6-12 in., or ≥ 1 in. extruded polystyrene insulation with taped joints. [3, 4, 5]
1.4 Capillary break at all crawlspace floors using ≥ 6 mil polyethylene sheeting, lapped 6-12 in., & installed using one of the following: [3, 4, 5]
1.4.1 Placed beneath a concrete slab; OR,
1.4.2 Lapped up each wall or pier and fastened with furring strips or equivalent; OR,
1.4.3 Secured in the ground at the perimeter using stakes.
1.5 Exterior surface of below-grade walls of basements & unvented crawlspaces finished as follows: a) For poured concrete, masonry, & insulated concrete forms, finish with damp-proofing coating. [6] b) For wood framed walls, finish with polyethylene and adhesive or other equivalent waterproofing.
1.6 Class 1 vapor retarder not installed on interior side of air permeable insulation in exterior below-grade walls. [7]
1.7 Sump pump covers mechanically attached with full gasket seal or equivalent.
1.8 Drain tile installed at basement and crawlspace walls, with the top of the drain tile pipe below the bottom of the concrete slab or crawlspace floor. Drain tile surrounded with ≥ 6 in. of ½ to ¾ in. washed or clean gravel and with gravel layer fully wrapped with fabric cloth. Drain tile level or sloped to discharge to outside grade (daylight) or to a sump pump. If drain tile is on interior side of footing, then channel provided through footing to exterior side. [8]
2. Water-Managed Wall Assembly
2.1 Flashing at bottom of exterior walls with weep holes included for masonry veneer and weep screed for stucco cladding systems, or equivalent drainage system. [9]
2.2 Fully sealed continuous drainage plane behind exterior cladding that laps over flashing in Item 2.1 and fully sealed at all penetrations. Additional bond-break drainage plane layer provided behind all stucco and non-structural masonry cladding wall assemblies. [9, 10]
2.3 Window and door openings fully flashed. [11]
3. Water-Managed Roof Assembly
3.1 Step and kick-out flashing at all roof-wall intersections, extending ≥ 4" on wall surface above roof deck and integrated shingle-style with drainage plane above; boot / collar flashing at all roof penetrations. [12]
3.2 For homes that don't have a slab-on-grade foundation and do have expansive or collapsible soils, gutters & downspouts provided that empty to lateral piping that discharges water on sloping final grade ≥ 5 ft. from foundation, or to underground catchment system not connected to the foundation drain system that discharges water ≥ 10 ft. from foundation. See Footnote for alternatives & exemptions. [3, 13, 14]
3.3 Self-adhering polymer-modified bituminous membrane at all valleys & roof deck penetrations. [3, 15]
3.4 In 2009 IECC Climate Zones 5 & higher, self-adhering polymer-modified bituminous membrane over sheathing at eaves from the edge of the roof line to > 2 ft. up roof deck from the interior plane of the exterior wall. [3, 15]
4. Water-Managed Building Materials
4.1 Wall-to-wall carpet *not* installed within 2.5 ft. of toilets, tubs, and showers.
4.2 Cement board or equivalent moisture-resistant backing material installed on all walls behind tub and shower enclosures composed of tile or panel assemblies with caulked joints. Paper-faced backerboard shall not be used. [16]
4.3 In Warm-Humid climates, Class 1 vapor retarders not installed on the interior side of air permeable insulation in above-grade walls, except at shower and tub walls. [7]
4.4 Building materials with visible signs of water damage or mold *not* installed or allowed to remain. [17]
4.5 Framing members & insulation products having high moisture content *not* enclosed (e.g., with drywall). [18]
4.6 For each condensate-producing HVAC component, corrosion-resistant drain pan (e.g., galvanized steel, plastic) included that drains to a conspicuous point of disposal in case of blockage. Backflow prevention valve included if connected to a shared drainage system.

Footnotes:

1. These requirements are designed to improve moisture control in homes. However, these features alone cannot prevent all moisture problems. For example, leaky pipes or overflowing baths can lead to moisture issues and negatively impact the performance of the home.
2. Swales or drains designed to carry water from foundation are permitted to be provided as an alternative to the slope requirements for any home, and shall be provided for a home where setbacks limit space to less than 10 ft. Also, tamping of back-fill is not required if either: proper drainage can be achieved using non-settling compact soils, as determined by a certified hydrologist, soil scientist, or engineer; OR, the builder has scheduled a site visit to provide in-fill and final grading after settling has occurred (e.g., after the first rainy season).