

Home Energy Rating Certificate



Property
Annette Martin
2135 Knollwood Dr
Boulder, CO 80302

HERS
Rating Type: Projected Rating
Rating Date: 08/09/2016
Registry ID:

Certified Energy Rater: Luke Griess
Rating Number:

Projected Rating: Based on Plans - Field Confirmation Required.

HERS Index: 25

General Information

Conditioned Area	4759 sq. ft.	House Type	Single-family detached
Conditioned Volume	47153 cubic ft.	Foundation	More than one type
Bedrooms	3		

Mechanical Systems Features

Heating:	Fuel-fired hydronic distribution, Natural gas, 95.0 AFUE.
Cooling:	Air conditioner, Electric, 21.0 SEER.
Cooling:	Air conditioner, Electric, 21.0 SEER.
Duct Leakage to Outside	84.80 CFM25.
Ventilation System	Balanced: HRV, 105 cfm, 80.0 watts.
Programmable Thermostat	Heat=Yes; Cool=Yes

Building Shell Features

Ceiling Flat	NA	Slab	R-10.0 Edge, R-10.0 Under
Sealed Attic	NA	Exposed Floor	R-60.0
Vaulted Ceiling	R-38.0	Window Type	U-Value: 0.280, SHGC: 0.230
Above Grade Walls	R-27.0	Infiltration Rate	Htg: 0.15 Clg: 0.15 ACHnat
Foundation Walls	R-15.0	Method	Blower door test

Lights and Appliance Features

Percent Interior Lighting	70.00	Range/Oven Fuel	Natural gas
Percent Garage Lighting	100.00	Clothes Dryer Fuel	Electric
Refrigerator (kWh/yr)	637	Clothes Dryer EF	3.01
Dishwasher (kWh/yr)	279	Ceiling Fan (cfm/Watt)	0.00

Estimated Annual Energy Cost

Use	MMBtu	Cost	Percent
Heating	63.5	\$851	105%
Cooling	5.8	\$56	7%
Hot Water	4.0	\$90	11%
Lights/Appliances	34.6	\$899	110%
Photovoltaics	-46.4	-\$1291	-159%
Service Charges		\$209	26%
Total	61.5	\$814	100%

Criteria

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

Luke Griess
Scott Home Inspection, LLC
Certified HERS Rater # 2186412
www.ScottHomeInspection.com
(303) 373-2424

REM/Rate - Residential Energy Analysis and Rating Software v14.6.1

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The Home Energy Rating Standard Disclosure for this home is available from the rating provider.

ENERGY STAR v3.0 Home Report

Property
Annette Martin
2135 Knollwood Dr
Boulder, CO 80302

Organization
Scott Home Inspection, LLC
970-532-2424
Luke Griess

HERS
Projected Rating
08/09/2016
Rater ID:2186412



Weather: Boulder, CO
The Martin Residence
0238_MartinRes_2135Knollwood_E
SV3_160809_LG_V2.blg

Builder
Valentine Construction

Projected Rating: Based on Plans - Field Confirmation Required. Normalized, Modified End-Use Loads (MMBtu/yr)

	ENERGY STAR	As Designed
Heating	59.7	63.5
Cooling	20.4	5.8
Water Heating	15.5	4.0
Lights and Appliances	36.1	34.6
Total	131.6	107.9
HERS Index of Reference Design Home	68	55 HERS Index w/o PV
HERS Index Target (SAF Adjusted)	56	25 HERS Index
Size Adjustment Factor	0.82	

ENERGY STAR v3.0 Mandatory Requirements

X	Duct leakage at post construction better than or equal to ENERGY STAR v3.0 requirements.
X	Envelope insulation levels meet or exceed ENERGY STAR v3.0 requirements.
X	Slab on Grade Insulation must be > R-5, and at IECC 2009 Depth for Climate Zones 4 and above.
X	Envelope insulation achieves RESNET Grade I installation, or Grade II with insulated sheathing.
X	Windows meet the 2009 IECC Requirements - Table 402.1.1.
X	Duct insulation meets the EPA minimum requirements of R-6.
X	Mechanical ventilation system is installed in the home.
X	ENERGY STAR Checklists fully verified and complete.



This home MEETS or EXCEEDS the energy efficiency requirements for designation as an EPA ENERGY STAR Version 3 Qualified Home.

HERS Index w/o PV <= HERS Index of Reference Design Home AND HERS Index <= HERS Index Target to comply.

Pollution Prevented

Type of Emissions	Reduction
Carbon Dioxide (CO2) - tons/yr	8.5
Sulfur Dioxide (SO2) - lbs/yr	9.9
Nitrogen Oxides (NOx) - lbs/yr	23.1

Energy Cost Savings

	\$/yr
Heating	371
Cooling	270
Water Heating	80
Lights & Appliances	254
Total	975

The energy savings and pollution prevented are calculated by comparing the Rated Home to the ENERGY STAR Version 3 Reference Home as defined in the ENERGY STAR Qualified Homes HERS Index Target Procedure for National Program Requirements, Version 3.0 promulgated by the Environmental Protection Agency (EPA). In accordance with RESNET Mortgage Industry National Home Energy Rating Systems Standards, building inputs affecting setpoints infiltration rates, window shading and the existence of mechanical systems may have been changed prior to calculating loads.

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Building Information

Conditioned Area (sq ft)	4759
Conditioned Volume (cubic ft)	47153
Insulated Shell Area (sq ft)	11810
Number of Bedrooms	3
Housing Type	Single-family detached
Foundation Type	More than one type

Rating

HERS Index	25
HERS Index w/o PV	55
HERS Index Target (SAF Adjusted)	56
HERS Index of Reference Design Home	68
Size Adjustment Factor	0.82



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	None	Window Type	Dble/LoE/Cld .28,.23
Sealed Attic	None	Window	U-Value: 0.280, SHGC: 0.230
Vaulted Ceiling	R-38, Vault 2x6, G1 U=0.032	Window/Wall Ratio	0.22
Above Grade Walls	R-27 G1, 16"OC G1 U=0.051	Infiltration Type	Blower door test
Found. Walls(Cond)	R-15 Frame, G1 R=15.0	Infiltration	Htg: 0.15 Clg: 0.15 ACHnat
Found. Walls(Uncond)	R-15 Draped, Full R=15.0	Duct Leakage to Outside	84.80 CFM @ 25 Pascals
Floors	R-60 G1 U=0.020	Total Duct Leakage	84.80 CFM @ 25 Pascals
Slab Floors	R-10 Per+R10 Und U=0.044		

Mechanical Systems

Heating	Fuel-fired hydronic distribution, 223.0 kBtuh, 95.0 AFUE.
Cooling	Air conditioner, 24.0 kBtuh, 21.0 SEER.
Cooling	Air conditioner, 18.0 kBtuh, 21.0 SEER.
Water Heating	Integrated, Gas, 0.87 EF.
Programmable Thermostat	Heat=Yes; Cool=Yes
Ventilation System	Balanced: HRV, 105 cfm, 80.0 watts.

Lights and Appliances

Percent Interior Lighting	70.00	Clothes Dryer Fuel	Electric
Percent Garage Lighting	100.00	Clothes Dryer EF	3.01
Refrigerator (kWh/yr)	637.00	Clothes Washer LER	96.00
Dishwasher kWh/yr	279	Clothes Washer Capacity	3.81

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

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Lights and Appliances

Ceiling Fan (cfm/Watt):	0.00	Range/Oven Fuel	Natural gas
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Energy Cost and Features

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Annual Energy Costs	\$/yr
Heating	851
Cooling	56
Water Heating	90
Lights & Appliances	914
Photovoltaics	-1291
Service Charges	209
Total	829
Average Monthly(\$/Month)	69

Energy Features

Ceiling w/Attic	None
Sealed Attic	None
Vaulted Ceiling	R-38, Vault 2x6, G1 U=0.032
Above Grade Wall	R-27 G1, 16"OC G1 U=0.051
Foundation Walls (Cond)	R-15 Frame, G1 R=15.0
Foundation Walls (Uncond)	R-15 Draped, Full R=15.0
Doors	Fibergl-R5 U=0.182
Windows	Dble/LoE/Cld -.28, 23 U=0.280
Floors	R-60 G1 U=0.020
Slab Floors	R-10 Per+R10 Und U=0.044
Infiltration	Htg: 0.15 Clg: 0.15 ACHnat
Infiltration Measure	Blower door test
Mechanical Ventilation	Balanced: HRV, 105 cfm, 80.0 watts.
Interior Mass	None
Mechanical Equipment 1	Heating: Fuel-fired hydronic distribution, 223.0 kBtuh, 95.0 AFUE.
Mechanical Equipment 2	Cooling: Air conditioner, 24.0 kBtuh, 21.0 SEER.
Mechanical Equipment 3	Cooling: Air conditioner, 18.0 kBtuh, 21.0 SEER.
Mechanical Equipment 4	Water Heating: Integrated, Gas, 0.87 EF.
Programmable Thermostat	Heat=Yes; Cool=Yes
Ducts	UninsulatedConditioned space
Duct Leakage to Outside	84.80 CFM @ 25 Pascals
Total Duct Leakage	84.80 CFM @ 25 Pascals

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

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Energy Features

	Defaults
Lights/Appliances	
Active Solar	None
Photovoltaics	8800.00
Sunspace	No

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Performance Report

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Annual Load	MMBtu/yr
Heating	104.7
Cooling	10.5
Water Heating	11.8

Annual Consumption	MMBtu/yr
Heating	112.0
Cooling	2.0
Water Heating	12.4
Lights & Appliances	35.1
Photovoltaics	-46.4
Total	115.1

Annual Energy Cost	\$/yr
Heating	851
Cooling	56
Water Heating	90
Lights & Appliances	914
Photovoltaics	-1291
Service Charges	209
Total	829

Design Loads	kBtu/hr
Space Heating	64.8
Space Cooling	26.5

Utility Rates	
Electricity	Xcel Electric
Gas	Xcel Natural Gas

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Performance Report

Property
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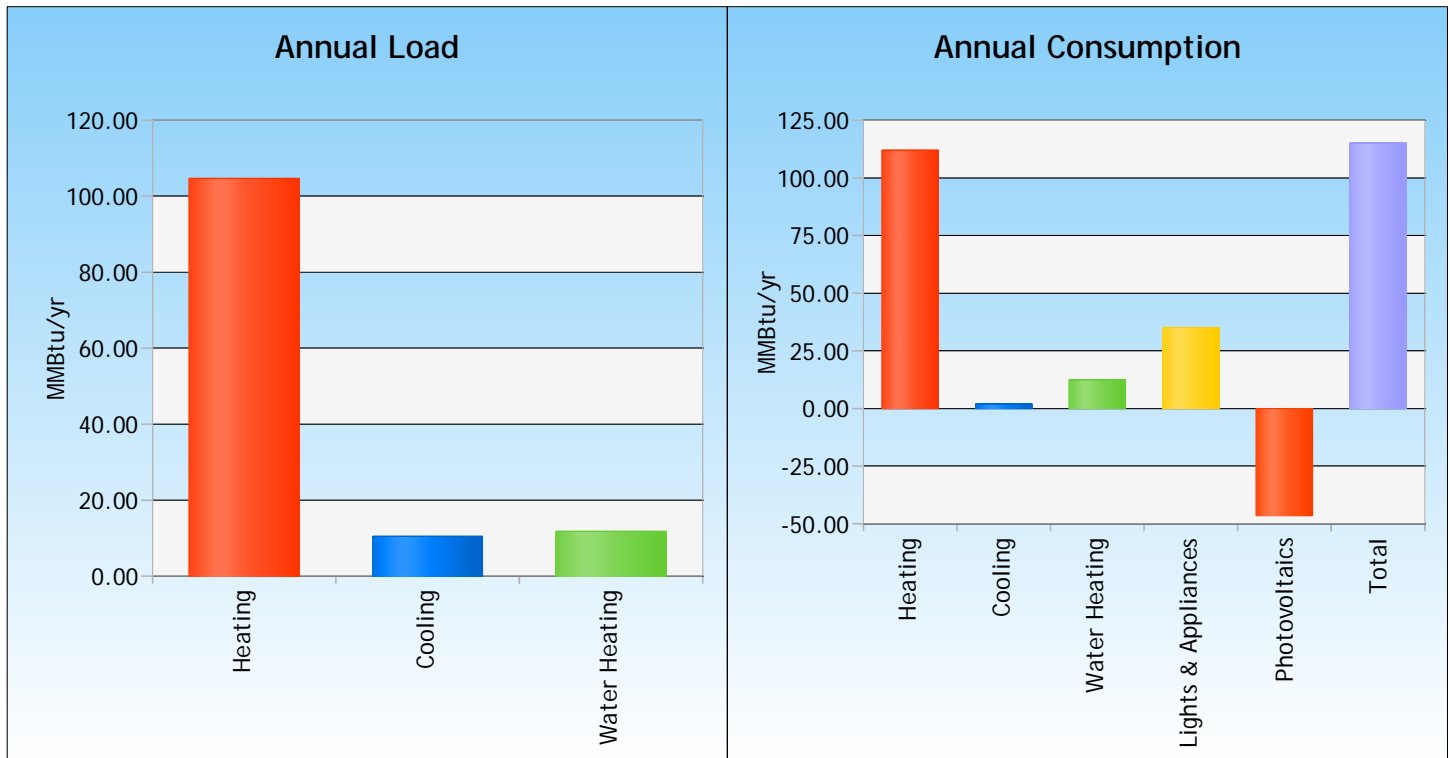
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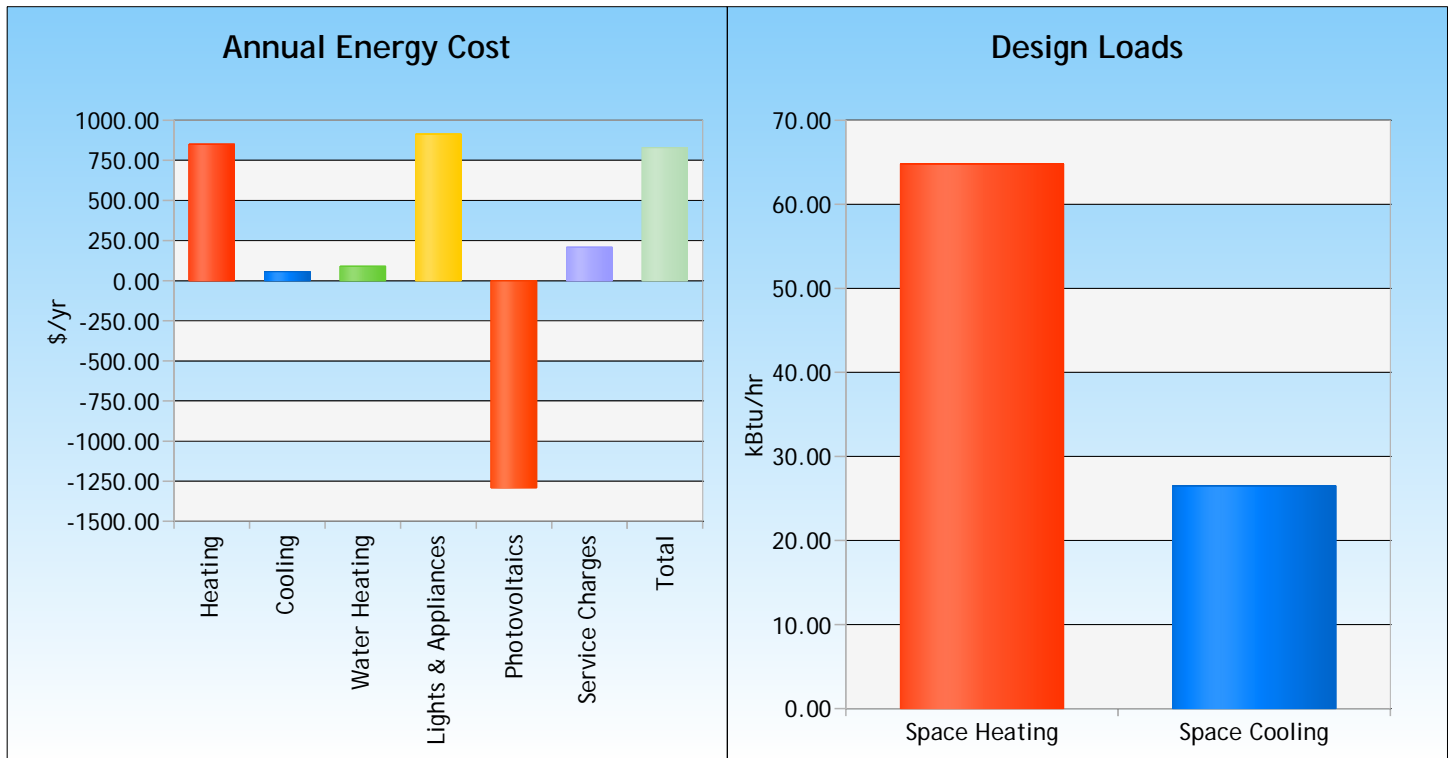
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Emissions

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Emissions By End-Use

Carbon Dioxide (CO2) - tons/year

Heating	7.1
Cooling	0.5
WaterHeating	0.7
LightsAppliances	8.3
Photovoltaics	-11.8
Total	4.8

Sulfur Dioxide (SO2) - lbs/year

Heating	1.0
Cooling	1.1
WaterHeating	0.0
LightsAppliances	17.9
Photovoltaics	-25.9
Total	-5.8

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Nitrogen Oxide (NOx) - lbs/year

Heating	17.8
Cooling	1.5
WaterHeating	1.9
LightsAppliances	24.2
Photovoltaics	-34.4
Total	11.0

Site-to-source energy multipliers and air emission data were taken from the US EPA eGRID2012 database.

Lights and Appliances

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Electric Consumption

kWh/yr

Interior Lighting	2603.4
Exterior Lighting	84.5
Garage Lighting	25.0
Refrigerator	637.0
Freezer	0.0
Dishwasher	133.1
Oven/Range	30.7
Clothes Washer	74.0
Clothes Dryer	376.4
Mechanical Ventilation Fan	467.2
Ceiling Fan	0.0
Plug Loads	4950.7

Total 9382.0

Fossil Fuel Consumption

MMBtu/yr

Dryer	0.0
Oven/Range	3.1
Total	3.1

Annual Energy Cost

\$/yr

Interior Lighting	247
Exterior Lighting	8
Garage Lighting	2
Refrigerator	61
Freezer	0
Dishwasher	13
Oven/Range	25
Clothes Washer	7
Clothes Dryer	36
Mechanical Ventilation Fan	44
Ceiling Fan	0
Plug Loads	470
Total	914

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Air Leakage

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Whole House Infiltration

	Blower Door Test	
	Heating	Cooling
Natural ACH	0.15	0.15
ACH @ 50 Pascals	2.46	3.23
CFM @ 25 Pascals	1232	1620
CFM @ 50 Pascals	1934	2542
Eff. Leakage Area (sq.in)	106.2	139.5
Specific Leakage Area	0.00015	0.00020
ELA/100 sf shell (sq.in)	0.90	1.18

Duct Leakage

Leakage to Outside Units			
CFM @ 25 Pascals		85	
CFM25 / CFMfan		0.1060	
CFM25 / CFA		0.0400	
CFM per Std 152		N/A	
CFM per Std 152 / CFA		N/A	
CFM @ 50 Pascals		133	
Eff. Leakage Area (sq.in)		7.31	
Thermal Efficiency		N/A	
Total Duct Leakage Units	CFM25/CFA		
Total Duct Leakage		0.0400	

Ventilation

Mechanical	Balanced	ASHRAE
Sensible Recovery Eff. (%)	62.0	62.2-2010
Total Recovery Eff. (%)	0.0	
Rate (cfm)	105	78
Hours/Day	16.0	24.0
Fan Watts	80.0	
Cooling Ventilation	Natural Ventilation	

ASHRAE 62.2 - Ventilation Requirements

The ASHRAE 62.2 flow rates shown above are the CONTINUOUS mechanical fresh air ventilation which will meet the 'whole-building' requirement under that version of the standard. Both values incorporate any appropriate 'infiltration credit'. Intermittent mechanical ventilation may be used if the flow rate is adjusted accordingly. For example, the runtime can be reduced to 12 hours per day using a doubled flow rate, as long as the system provides ventilation at least once every 3 hours. For more detail, refer to the appropriate standard.

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Builder
Valentine Construction

Property/Builder Information

Building Name	The Martin Residence
Owner's Name	Annette Martin
Property Address	2135 Knollwood Dr
City, St, Zip	Boulder, CO 80302
Phone Number	(303) 358-6994

Builder's Name	Valentine Construction
Phone Number	(303) 443-2910
Email Address	
Plan/Model Name	
Community/Development	
Permit Date/Number	

Rating Organization/RESNET Information

Organization Name	Scott Home Inspection, LLC
Address	3728 W CR-10
City, St, Zip	Berthoud, CO 80513
Phone Number	970-532-2424
Website	scotthomeinspection.com
Rater's Name	Luke Griess
Rater's Email	luke@scotthomeinspection.com

Rater's ID	2186412
Provider ID	1998-146
Sample Set ID	00000000
Registry ID	

Rating Date	08/09/2016
Rating Type	Projected Rating
Reason for Rating	New Home
Rating Number	

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General Building Information

Area of Conditioned. Space(sq ft)	4759
Volume of Conditioned. Space	47153
Year Built	2016
Housing Type	Single-family detached
Level Type(Apartments Only)	None
Floors on or Above-Grade	2
Number of Bedrooms	3
Foundation Type	More than one type
Enclosed Crawl Space Type	N/A
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)
Cbsmt to amb on g	R-15 Frame, G1	Cond->ambient/grr	101.0	8.9	0.0	8.9	0.079	0.086
Cbsmt to amb b g	R-15 Frame, G1	Cond->ambient/grr	47.0	8.9	3.0	5.9	0.074	0.086
Cbsmt to gar	R-15 Frame, G1	Cond->garage/grnd	36.0	8.9	8.4	0.5	0.051	0.086
Ubsmt to amb	R-15 Draped, Full	Uncond bsmt->amb/grnd	63.0	7.8	7.3	0.5	0.044	0.064
Ubsmt to gar	R-15 Draped, Full	Uncond bsmt->garage/grnd	7.0	7.8	7.3	0.5	0.044	0.064

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

Foundation Wall Library List

Foundation Wall: R-15 Frame, G1

Type	Solid concrete or stone
Thickness(in)	8.0
Studs	Wood, 2x4, 16" o.c.
Interior Insulation	
Continuous R-Value	0.0
Frame Cavity R-Value	15.0
Cavity Insulation Grade	1
Ins top	0.0 ft from top of wall
Ins Bottom	0.0 ft from bottom of wall

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Foundation Wall Library List

Exterior Insulation

R-Value	0.0
Ins top	0.0 ft from top of wall
Ins bottom	0.0 ft below grade

Note

Foundation Wall: R-15 Draped, Full

Type	Solid concrete or stone
Thickness(in)	8.0
Studs	None
Interior Insulation	
Continuous R-Value	15.0
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
Ins bottom	0.0 ft below grade

Note

Slab Floor Information

Name	Library Entry	Area(sq ft)	Depth Below Grade(ft)	Full Perimeter(ft)	Exposed Perimeter(ft)	On-Grade Perimeter(ft)
Cbsmt slab on g	R-10 Per+R10 Und	774	0.0	156	98	98
Cbsmt slab >1' bg	R-10 Per+R10 Und	850	3.0	190	89	0

Slab Floor Library List

Slab Floor: R-10 Per+R10 Und

Slab Covering	Carpet
Perimeter Insulation (R-Value)	10.0
Perimeter Insulation Depth (ft)	2.0
Under-Slab Insulation (R-Value)	10.0
Under-Slab Insulation Width (ft)	99.0

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Slab Floor Library List

Slab Insulation Grade	1
Radiant Slab	No
Note	

Frame Floor Information

Name	Library Entry	Location	Area(sq ft)	Uo Value
14" TJI to ambient	R-60 G1	Btwn cond & ambient	100	0.020
14" TJI to Ubsmt	R-60 G1	Btwn cond & ambient	475	0.020
11.9" TJI to amb	R-52 G1	Btwn cond & ambient	54	0.023
11.9" TJI to gar	R-52 G1	Btwn cond & ambient	498	0.023

Frame Floor Library List

Floor: R-60 G1

Information From Quick Fill Screen

Continous Insulation R-Value	0.0
Cavity Insulation R-Value	60.0
Cavity Insulation Thickness (in.)	14.0
Cavity Insulation Grade	1
Joist Size (w x h, in)	1.5 x 14.0
Joist Spacing (in oc)	16.0
Framing Factor - (default)	0.1300
Floor Covering	HARDWOOD
Note	2" closed cell foam + 12" blown in fiberglass

Floor: R-52 G1

Information From Quick Fill Screen

Continous Insulation R-Value	0.0
Cavity Insulation R-Value	52.0
Cavity Insulation Thickness (in.)	11.9
Cavity Insulation Grade	1
Joist Size (w x h, in)	1.5 x 14.0
Joist Spacing (in oc)	16.0
Framing Factor - (default)	0.1300
Floor Covering	HARDWOOD
Note	2" closed cell foam + 9.8" blown in fiberglass

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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 and band to amb	Cond -> ambient	165.00	0.0	1.0	3.0	16.0	1	0.208
Rim and band to gar	Cond -> garage	36.00	0.0	1.0	3.0	16.0	1	0.208

Above-Grade Wall

Name	Library Entry	Location	Exterior Color	Area(sq ft)	Uo Value
AGW to amb siding	R-27 G1, 16"OC G1	Cond -> ambient	Medium	3295.00	0.051
AGW to amb stone	R-27 G1, 16"OC G1 BV	Cond -> ambient	Medium	692.00	0.049
Cbsmt to Ubsmt	R-15, G1	Cond -> uncond bsmt	Medium	44.50	0.078
AGW to gar	R-27 G1, 16"OC G1	Cond -> garage	Medium	374.00	0.051

Above-Grade Wall Library List

Above-Grade Wall: R-27 G1, 16"OC G1

Information From Quick Fill Screen

Wall Construction Type	Standard Wood Frame
Continuous Insulation (R-Value)	0.0
Frame Cavity Insulation (R-Value)	27.0
Frame Cavity Insulation Thickness (in)	5.5
Frame Cavity Insulation Grade	1
Stud Size (w x d, in)	1.5 x 5.5
Stud Spacing (in o.c.)	16.0
Framing Factor - (default)	0.2300
Gypsum Thickness (in)	0.5
Note	2" Closed Cell foam + R13 fiberglass

Above-Grade Wall: R-27 G1, 16"OC G1 BV

Information From Quick Fill Screen

Wall Construction Type	Std Frame w/Brick Veneer
Continuous Insulation (R-Value)	0.0
Frame Cavity Insulation (R-Value)	27.0
Frame Cavity Insulation Thickness (in)	5.5
Frame Cavity Insulation Grade	1
Stud Size (w x d, in)	1.5 x 5.5

Building Summary

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2135 Knollwood Dr
Boulder, CO 80302

Organization
Scott Home Inspection, LLC
970-532-2424
Luke Griess

HERS
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Above-Grade Wall Library List

Stud Spacing (in o.c.)	16.0
Framing Factor - (default)	0.2300
Gypsum Thickness (in)	0.5
Note	2" Closed Cell foam + R13 fiberglass, stone or brick veneer

Above-Grade Wall: R-15, G1

Information From Quick Fill Screen

Wall Construction Type	Standard Wood Frame
Continuous Insulation (R-Value)	0.0
Frame Cavity Insulation (R-Value)	15.0
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

Name	Wall Assignment	Orient	U-Value	SHGC	Area (sqft)	Overhang			Interior		Adjacent	
						Depth (ft)	To Top (ft)	To Btm (ft)	Winter Shading	Summer Shading	Winter Shading	Summer Shading
0FW	FndWall 1	North	0.300	0.210	5.40	0.0	0.0	0.0	0.85	0.70	Some	Some
0FW	FndWall 1	North	0.300	0.210	5.40	0.0	0.0	0.0	0.85	0.70	Some	Some
1FW	AGWall 1	North	0.280	0.230	48.00	0.0	0.0	0.0	0.85	0.70	None	None
1FW	AGWall 1	North	0.280	0.230	12.00	0.0	0.0	0.0	0.85	0.70	None	None
1FW	AGWall 1	North	0.280	0.230	30.00	0.0	0.0	0.0	0.85	0.70	Some	Some
1FW	AGWall 1	North	0.280	0.230	16.00	0.0	0.0	0.0	0.85	0.70	Some	Some
2FW	AGWall 1	North	0.280	0.230	16.00	1.5	0.5	2.5	0.85	0.70	Some	Some
2FW	AGWall 1	North	0.300	0.210	16.00	1.5	0.5	2.5	0.85	0.70	Some	Some
2FW	AGWall 1	North	0.280	0.230	48.00	0.0	0.0	0.0	0.85	0.70	None	None
2FW	AGWall 1	North	0.280	0.230	24.00	0.0	0.0	0.0	0.85	0.70	Some	Some
2FW	AGWall 1	North	0.280	0.230	24.00	0.0	0.0	0.0	0.85	0.70	Some	Some
1RW	AGWall 2	West	0.300	0.210	12.00	0.0	0.0	0.0	0.85	0.70	Some	Some
1RW	AGWall 2	West	0.300	0.210	5.40	0.0	0.0	0.0	0.85	0.70	Some	Some

REM/Rate - Residential Energy Analysis and Rating Software v14.6.1

This information does not constitute any warranty of energy cost or savings.

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Building Summary

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Scott Home Inspection, LLC
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Valentine Construction

Window Information

Name	Wall Assignment	Orient	U-Value	SHGC	Area (sqft)	Overhang			Interior		Adjacent	
						Depth (ft)	To Top (ft)	To Btm (ft)	Winter Shading	Summer Shading	Winter Shading	Summer Shading
1RW	AGWall 1	West	0.280	0.230	14.00	0.0	0.0	0.0	0.85	0.70	Some	Some
1RW	AGWall 1	West	0.280	0.230	7.00	0.0	0.0	0.0	0.85	0.70	Some	Some
2RW	AGWall 1	West	0.280	0.230	4.00	1.5	0.5	2.5	0.85	0.70	Most	Most
2RW	AGWall 1	West	0.280	0.230	4.00	1.5	0.5	2.5	0.85	0.70	Most	Most
2RW	AGWall 1	West	0.280	0.230	4.00	1.5	0.5	2.5	0.85	0.70	Most	Most
2RW	AGWall 1	West	0.280	0.230	24.00	0.0	0.0	0.0	0.85	0.70	None	None
2RW	AGWall 1	West	0.280	0.230	48.00	0.0	0.0	0.0	0.85	0.70	None	None
OBW	FndWall 2	South	0.300	0.210	5.40	0.0	0.0	0.0	0.85	0.70	Some	Some
OBW	FndWall 2	South	0.300	0.210	5.40	0.0	0.0	0.0	0.85	0.70	Some	Some
OBW	FndWall 2	South	0.300	0.210	5.40	0.0	0.0	0.0	0.85	0.70	Some	Some
OBW	FndWall 1	South	0.280	0.230	42.00	0.0	0.0	0.0	0.85	0.70	Some	Some
OBW	FndWall 1	South	0.280	0.230	21.00	0.0	0.0	0.0	0.85	0.70	Some	Some
OBW	FndWall 1	South	0.280	0.230	21.00	0.0	0.0	0.0	0.85	0.70	Some	Some
OBD	FndWall 1	South	0.290	0.190	126.00	18.0	1.0	9.0	0.85	0.70	Some	Some
OBW	FndWall 1	South	0.300	0.210	36.00	16.0	1.0	7.0	0.85	0.70	Some	Some
OBW	FndWall 1	South	0.300	0.210	18.00	16.0	1.0	7.0	0.85	0.70	Some	Some
1BW	AGWall 2	South	0.300	0.210	5.40	1.0	1.5	3.8	0.85	0.70	Some	Some
1BW	AGWall 2	South	0.300	0.210	5.40	1.0	1.5	3.8	0.85	0.70	Some	Some
1BW	AGWall 2	South	0.300	0.210	5.40	1.0	1.5	3.8	0.85	0.70	Some	Some
1BW	AGWall 1	South	0.300	0.210	7.00	3.0	1.0	3.0	0.85	0.70	None	None
1BW	AGWall 1	South	0.280	0.230	56.00	3.0	1.0	9.0	0.85	0.70	None	None
1BW	AGWall 1	South	0.280	0.230	35.00	3.0	1.0	11.0	0.85	0.70	None	None
1BD	AGWall 1	South	0.300	0.210	160.00	9.0	1.0	9.0	0.85	0.70	None	None
1BD	AGWall 1	South	0.300	0.210	90.00	5.5	1.0	8.0	0.85	0.70	Some	Some
1BW	AGWall 1	South	0.280	0.230	21.00	5.5	1.0	8.0	0.85	0.70	Some	Some
2BW	AGWall 1	South	0.300	0.210	48.00	0.0	0.0	0.0	0.85	0.70	None	None
2BW	AGWall 1	South	0.300	0.210	5.40	1.5	1.0	3.3	0.85	0.70	Some	Some
2BW	AGWall 1	South	0.280	0.230	16.00	0.0	0.0	0.0	0.85	0.70	None	None
OLW	FndWall 1	East	0.300	0.210	18.00	35.0	1.0	7.0	0.85	0.70	Most	Most
OLW	FndWall 1	East	0.300	0.210	6.00	0.0	0.0	0.0	0.85	0.70	None	None
1LW	AGWall 1	East	0.280	0.230	35.00	1.0	1.0	11.0	0.85	0.70	Some	Some

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Valentine Construction

Window Information

Name	Wall Assignment	Orient	U-Value	SHGC	Area (sqft)	Overhang			Interior		Adjacent	
						Depth (ft)	To Top (ft)	To Btm (ft)	Winter Shading	Summer Shading	Winter Shading	Summer Shading
1LD	AGWall 1	East	0.290	0.190	105.00	20.0	1.0	11.0	0.85	0.70	Some	Some
1LW	AGWall 1	East	0.290	0.190	21.00	0.0	0.0	0.0	0.85	0.70	None	None
1LW	AGWall 1	East	0.290	0.190	42.00	0.0	0.0	0.0	0.85	0.70	None	None
1LW	AGWall 2	East	0.290	0.190	12.00	0.0	0.0	0.0	0.85	0.70	Some	Some
2LW	AGWall 1	East	0.290	0.190	4.00	1.5	0.5	2.5	0.85	0.70	None	None

Door Information

Name	Library Entry	Wall Assignment	Opaque Area(sq ft)	Uo Value	R-Value of Opaque Area	Storm Door
Main entry	2-1/4 Wd solid core	AGWall 1	26.3	0.268	2.8	No
Garage entry	Fibergl-R5	AGWall 4	21.4	0.182	4.6	No
Cbsmt to Ubsmt	Fibergl-R5	AGWall 3	17.8	0.182	4.6	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
Vaulted	R-38, Vault 2x6, G1	1603.00	1603.00	Medium	No	Vaulted	0.032	No	No
Flat ceilings	R-38, Vault 2x6, G1	1212.00	1212.00	Light	No	Vaulted	0.032	No	No

Roof Library List

Ceiling: R-38, Vault 2x6, G1

Information From Quick Fill Screen

Continous Insulation (R-Value)	0.0
Cavity Insulation (R-Value)	38.0
Cavity Insulation Thickness (in)	5.5
Cavity Insulation Grade	1
Gypsum Thickness (in)	0.500
Bottom Chord/Rafter Size(w x h, in)	1.5 x 5.5
Bottom Chord/Rafter Spacing (in o.c.)	24.0
Framing Factor - (default)	0.1100

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Roof Library List

Ceiling Type	Vaulted
Note	Closed cell foam fill cavity

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Mechanical Equipment

Number of Mechanical Systems	4
Heating SetPoint(F)	68.00
Heating Setback Thermostat	Present
Cooling SetPoint(F)	78.00
Cooling Setup Thermostat	Present

Heat: Triangle Tube Sol250

SystemType	Fuel-fired hydronic distribution
Fuel Type	Natural gas
Rated Output Capacity (kBtuh)	223.0
Seasonal Equipment Efficiency	95.0 AFUE
Auxiliary Electric	510 kWh/yr
Note	
Number Of Units	1
Location	Conditioned area
Performance Adjustment	100
Percent Load Served	100

Cool: 21SEER A/C 24k

System Type	Air conditioner
Fuel Type	Electric
Rated Output Capacity (kBtuh)	24.0
Seasonal Equipment Efficiency	21.0 SEER
Sensible Heat Fraction (SHF)	0.70
Note	
Number Of Units	1
Location	Conditioned area
Performance Adjustment	100
Percent Load Served	57

Cool: Mitsubishi MiniSplT

System Type	Air conditioner
Fuel Type	Electric

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Mechanical Equipment

Rated Output Capacity (kBtuh)	18.0
Seasonal Equipment Efficiency	21.0 SEER
Sensible Heat Fraction (SHF)	1.00
Note	Mini-split, AC only, upper level
Number Of Units	1
Location	Conditioned area
Performance Adjustment	100
Percent Load Served	43

DHW: 80 gal. 0.87EF Int

Water Heater Type	Integrated
Fuel Type	Natural gas
Energy Factor	0.87
Recovery Efficiency	0.95
Water Tank Size (gallons)	80
Extra Tank Insulation (R-Value)	0.0
Note	Integrated side arm off boiler
Number Of Units	1
Location	Conditioned area
Performance Adjustment	100
Percent Load Served	100

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Duct Systems

Name

Conditioned Floor Area(sq ft)	2120.0
# of Returns	2
Heating System	N/A
Cooling System	21SEER A/C 24k
Supply Duct Surface Area(sq ft)	429.3
Return Duct Surface Area(sq ft)	159.0
Duct Leakage	
Qualitative Assessment	Not Applicable
Duct Leakage to Outside	
Supply+Return	84.80 CFM @ 25 Pascals
Supply Only	Not Applicable
Return Only	Not Applicable
Total Duct Leakage	84.80 CFM @ 25 Pascals
Duct Tightness Test	Rough-In Test - w/ Air Handler

Type	Location	Percent Location	R-Value
Supply	Conditioned space	100.0	0.0
Return	Conditioned space	100.0	0.0

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Infiltration and Mechanical Ventilation

Whole House Infiltration

Measurement Type	Blower door test
Heating Season Infiltration Value	0.15 Natural ACH
Cooling Season Infiltration Value	0.15 Natural ACH
Shelter Class	4
Code Verification	Tested

Mechanical Ventilation for IAQ

Type	Balanced
Rate(cfm)	105
Sensible Recovery Efficiency(%)	62.00
Total Recovery Efficiency(%)	0.00
Hours per Day	16.0
Fan Power (watts)	80.00

Ventilation Strategy for Cooling

Cooling Season Ventilation	Natural Ventilation
----------------------------	---------------------

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Lights and Appliances

Rating/RESNET audit

Ceiling Fan CFM / Watt	0.00
Refrigerator kWh/yr	637
Refrigerator Location	Conditioned
Range/Oven Fuel Type	Natural gas
Induction Range	No
Convection Oven	No

Dishwasher

Energy Factor	0.00
Dishwasher kWh/yr	279
Place Setting Capacity	12

Clothes Dryer

Fuel Type	Electric
Location	Conditioned
Moisture Sensing	No
Energy Factor	3.01
Gas Energy Factor	2.67

Clothes Washer

Location	Conditioned
LER (kWh/yr)	96
MEF	3.410
Capacity (CU.Ft)	3.810
Electricity Rate	0.11
Gas Rate	1.22
Annual Gas Cost	11.00

Qualifying Light Fixtures

Interior CFLs %	70.0
Interior Fluorescent %	0.0
Exterior Lights %	100.0
Garage Lights %	100.0

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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 2010	false
ENERGY STAR Products	false

ENERGY STAR Version 3 Checklist

Thermal Enclosure Checklist	true
HVAC System Quality Installation Contractor Checklist	true
HVAC System Quality Installation Rater Checklist	true
Water Management System Builder Checklist	true

ENERGY STAR Version 3 Appliances

	Exist	Amount
Refrigerators	false	0
Ceiling Fans	false	0
Exhaust Fans	false	0
Dishwashers	false	0

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:	false

Indoor airPlus Verification Checklist

Ducted Returns in each Bedroom	false
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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 EPA Indoor airPLUS	false
Verified Renewable Energy Ready Solar Electric	false
Verified Renewable Energy Ready Solar Hot Water	false

Optional Home Builder Commitments for Recognition

Certified under the EPA WaterSense for New Homes Program	Yes
Certified under the IBHS fortified for Safer Living Program	Yes
Followed the DOE Zero Energy Ready Home Quality	Yes

Management Guidelines

The buyer of this home signed a waiver giving DOE Zero Energy Ready Home access to utility bill data for one year.

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

Photovoltaics

Name	Collector Orientation	Collector Area(sq ft)	PV Panel Peak Power(Watts)	Collector Tilt(degrees)	Inverter Efficiency(%)
	South	561.0	8800.0	22.5	96.0

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Notes

HERS 26 Required, Boulder County New home

4198 cfa interior measurements,

ESV3 Required

Faces N

V2, 21 SEER AC units, keep the unico system on the main level, 21 Seer, and upper studio has a 21 mini-split

RESNET Home Energy Rating Standard Disclosure



For home located at: 2135 Knollwood Dr

City: Boulder State: CO

1. The Rater or Rater's employer is receiving a fee for providing the rating on this home.
2. In addition to the rating, the Rater or Rater's employer has also provided the following consulting services for this home.
 - A. Mechanical system design
 - B. Moisture control or indoor air quality consulting
 - C. Performance testing and/or commissioning other than required for the rating itself
 - D. Training for sales or construction personnel
 - E. Other (specify below)

3. The Rater or Rater's employer is:
 - A. The seller of this home or their agent
 - B. The mortgagor for some portion of the financial payments on this home
 - C. An employee, contractor or consultant of the electric and/or natural gas utility serving this home

4. The Rater or Rater's employer is a supplier or installer of products, which may include:

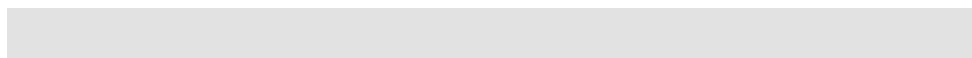
- HVAC Systems
- Thermal Insulation Systems
- Air sealing of envelope or duct systems
- Windows or window shading systems
- Energy efficient appliances
- Construction (builder, developer, construction contractor, etc.)
- Other (specify below):

Installed in this home by:		OR	is in the business of:	
<input type="checkbox"/> Rater	<input type="checkbox"/> Employer		<input type="checkbox"/> Rater	<input type="checkbox"/> Employer
<input type="checkbox"/> Rater	<input type="checkbox"/> Employer		<input type="checkbox"/> Rater	<input type="checkbox"/> Employer
<input type="checkbox"/> Rater	<input type="checkbox"/> Employer		<input type="checkbox"/> Rater	<input type="checkbox"/> Employer
<input type="checkbox"/> Rater	<input type="checkbox"/> Employer		<input type="checkbox"/> Rater	<input type="checkbox"/> Employer
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<input type="checkbox"/> Rater	<input type="checkbox"/> Employer		<input type="checkbox"/> Rater	<input type="checkbox"/> Employer
<input type="checkbox"/> Rater	<input type="checkbox"/> Employer		<input type="checkbox"/> Rater	<input type="checkbox"/> Employer

I attest that the above information is true and correct to the best of my knowledge. As a Rater or Rating Provider I abide by the rating quality control provisions of the Mortgage Industry National Home Energy Rating Standard as set forth by the Residential Energy Services Network (RESNET). The national rating quality control provisions of the rating standard are contained in Chapter One 4.C.8. of the standard and are posted at http://resnet.us/standards/RESNET_Mortgage_Industry_National_HERS_Standards.pdf. The Home Energy Rating Standard Disclosure for this home is available from the rating provider.

Luke Griess
 Rater's Printed Name

2186412
 Certification #


 Rater's Signature

August 12, 2016
 Date