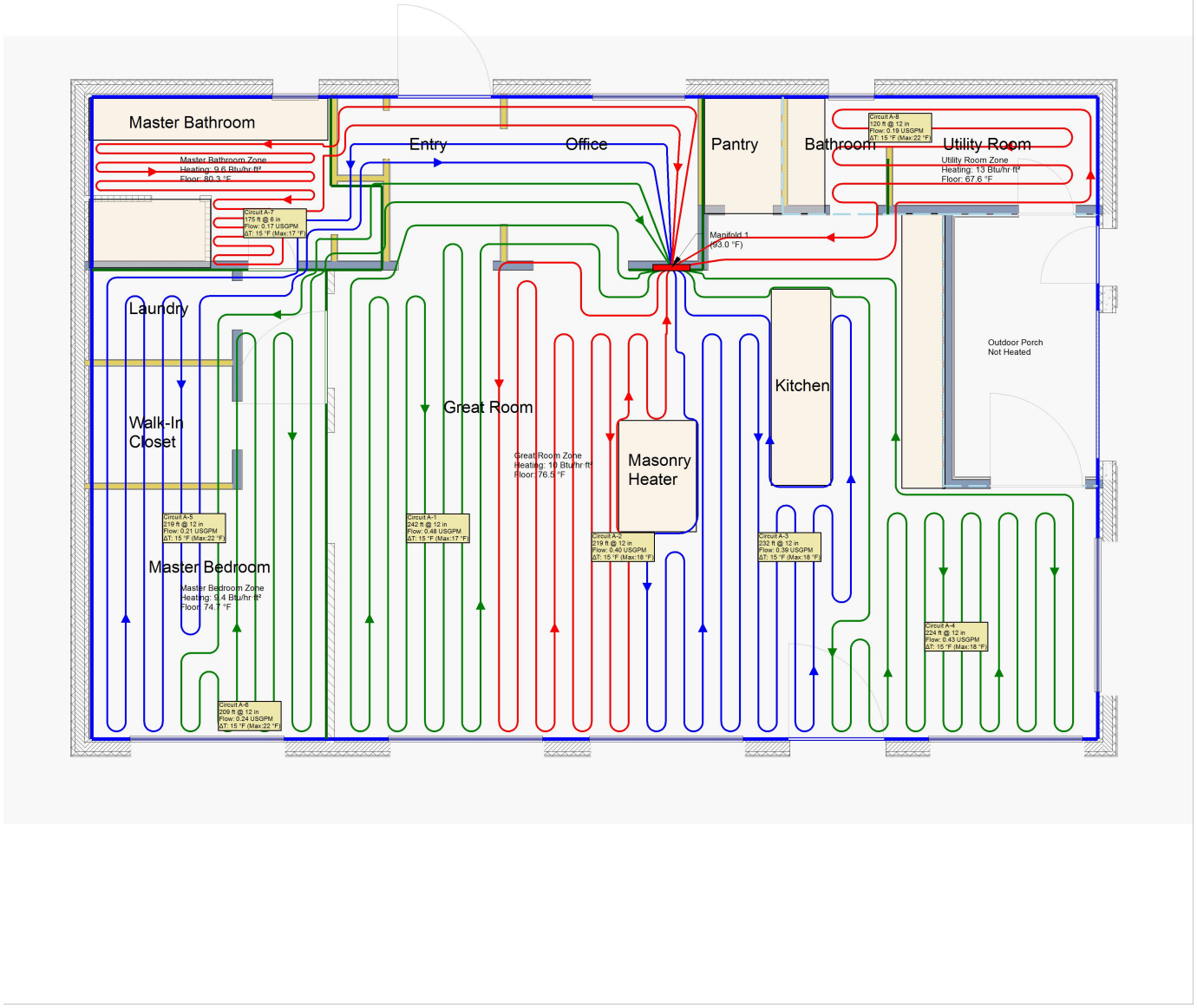

Project Number: Sunny Falls Ranch

Project Name: Passive Solar & HR Heated Residence

Location: 19000 E. Evans Creek Rd., Rogue River, OR 97537

Date: June 19, 2015

Prepared By: Robert Borst
Borst Engineering & Construction

Floor Plan: Ground Floor

Circuit Information:

Total Length: 1,641 ft - hePEX 1/2"

Circuit	Length	Manifold	Tube Type
A-1	242	Manifold 1	1/2
A-2	219	Manifold 1	1/2
A-3	232	Manifold 1	1/2
A-4	224	Manifold 1	1/2
A-5	219	Manifold 1	1/2
A-6	209	Manifold 1	1/2
A-7	175	Manifold 1	1/2
A-8	120	Manifold 1	1/2

Note: Details of the tubing bend radius have been simplified for clarity. Consult tubing manufacturer for specific bend radius recommendations.
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Robert Borst
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AED Report

Manual J8 Load Calculation

Project #:Sunny Falls Ranch

June 19, 2015

Project Information

Project #:	Sunny Falls Ranch	Notes:	
Name:	Passive Solar & HR Heated Residence		
Location:	19000 E. Evans Creek Rd., Rogue River, OR 97537		

Outdoor Conditions

Location:		(User Specified) Rogue River, Evans Creek Valley, Oregon
Elevation:		1550 ft
Latitude:		42.4
	Heating	**Cooling**
Dry Bulb:	26.0 °F	95.0 °F
Daily Range:		High
Wet Bulb:		66.0 °F

Indoor Conditions

	Heating	**Cooling**
Room Temp:	60 - 70 °F	
Design Temp Diff:	44.0 °F	20.0 °F
Humidity:	35	50
Moisture Diff (Grains):		-13.7

Floorplan/Levels

Ground Floor	1,789	ft²
Total Heated Area:	1,789	ft²
Total Cooled Area:	0	ft²

Disclaimers

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Load Summary

Manual J8 Load Calculation

Project #:Sunny Falls Ranch

June 19, 2015

Project Information

Project #: Sunny Falls Ranch

Notes:

Name: Passive Solar & HR Heated Residence

Location: 19000 E. Evans Creek Rd., Rogue River, OR 97537

Outdoor Conditions

Location:	(User Specified) Rogue River, Evans Creek Valley,Oregon
Elevation:	1550 ft
Latitude:	42.4

	Heating	Cooling
Dry Bulb:	26.0 °F	95.0 °F
Daily Range:		High
Wet Bulb:		66.0 °F

Infiltration

Method:	Simple
Stories:	1
Construction:	Tight
Exposure Category:	Three or Four Exposures
Num Fireplaces:	None
Net Air Changes (H/C):	0.14/0.00
Net Flow (H/C):	40 cfm/0 cfm

Indoor Conditions

	Heating	Cooling
Room Temp:	60 - 70 °F	
Design Temp Diff:	44.0 °F	20.0 °F
Humidity:	35	50
Moisture Diff (Grains):		-13.7

Ventilation

Num Occupants:	2

	Heating	Cooling
Type:	Heat Recovery	Heat Recovery
ACH:	0.35	
Outside Air:	101 cfm	0 cfm
Sensible Eff:	50 %	50 %

Floorplan/Levels

Ground Floor	1,789	ft²
Total Heated Area:	1,789	ft²
Total Cooled Area:	0	ft²

Total Heating: 18,811 Btu/hr

Total Sensible: 0 Btu/hr

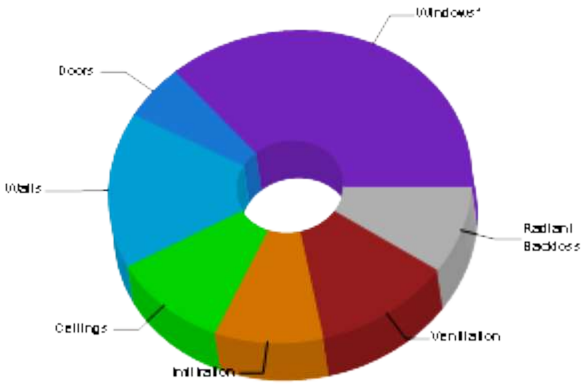
Total Latent: 0 Btu/hr

Load Breakdown

Name	Heating	Sensible	Latent
Windows*	6,913	0	
Skylights*	0	0	
Doors	1,048	0	
Walls	3,038	0	
Below Grade Walls	0		
Ceilings	2,017	0	
Floors	0	0	
Infiltration	1,816	0	0
Internal		0	0
Other	0		
Duct Loads	0	0	0
Ventilation	2,270	0	0
Humidification	0		
Piping Load	0		
Radiant Backloss	1,710		
Blower Heat		0	
AED*		0	
Total	18,811	0	0
Total Area	1,789 ft²	0 ft²	

*Average Load Procedure

Heating Load Breakdown



Length = ft Area = ft² Temperature = °F Flowrate = USGPM Heat Loss = Btu/hr
Unit Heat Loss = Btu/hr·ft² Rv = hr·ft²·°F/btu Head Loss = ft water RH = Radiant Floor Heating
BB = Baseboard FA = Forced Air OTH = Other Heating SM = Snowmelt N = Not Heated

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Version:15.0.0594

See sections at end of report for important Notes, Assumptions and Disclaimers.

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Load Report

Manual J8 Load Calculation
Project #:Sunny Falls Ranch
June 19, 2015

Project Information

Project #: Sunny Falls Ranch
Name: Passive Solar & HR Heated Residence
Location: 19000 E. Evans Creek Rd., Rogue River, OR 97537

Notes:

Manual J Load Summary

Total Heating: 18,811 Btu/hr **Total Sensible: 0 Btu/hr** **Total Latent: 0 Btu/hr**

Outdoor Conditions

Location:		(User Specified) Rogue River, Evans Creek Valley,Oregon
Elevation:		1550 ft
Latitude:		42.4
	Heating	**Cooling**
Dry Bulb:	26.0 °F	95.0 °F
Daily Range:		High
Wet Bulb:		66.0 °F

Indoor Conditions

	Heating	**Cooling**
Room Temp:	60 - 70 °F	
Design Temp Diff:	44.0 °F	20.0 °F
Humidity:	35	50
Moisture Diff (Grains):		-13.7

Infiltration

Method:	Simple
Stories:	1
Construction:	Tight
Exposure Category:	Three or Four Exposures
Num Fireplaces:	None
Net Air Changes (Heat/Cool):	0.14 / 0.00
Net Flow (Heat/Cool):	40 cfm / 0 cfm

Ventilation

Num Occupants:	2		
	Heating		**Cooling**
Type:	Heat Recovery	Type:	Heat Recovery
ACH:	0.35	Outside Air:	0 cfm
Outside Air:	101 cfm	Sensible Eff:	50 %
Sensible Eff:	50 %		

Floorplan/Levels

Ground Floor	1,789 ft²	Total Heated Area:	1,789 ft²
		Total Cooled Area:	0 ft²

Length = ft Area = ft² Temperature = °F Flowrate = USGPM Heat Loss = Btu/hr Unit Heat Loss = Btu/hr·ft² Rv = hr·ft²·°F/btu
Head Loss = ft water RH = Radiant Floor Heating BB = Baseboard FA = Forced Air OTH = Other Heating SM = Snowmelt N = Not Heated

Created Using LoopCAD 2015 Uponor(US) (2/6/2016)
Version:15.0.0594

See end of report for important Notes and Disclaimers.

Constructions

Walls

Code	Description	U-Value	Area	Heating	Cooling
14D-24	Foam Concrete Matrix - R-22 to R-26; No Cavity Insulation; Plus Interior Finish	0.04	1,235	2,294	0
12A-0bw	Frame Wall or Partition; Wood Framing; No Cavity Insulation; Brick Veneer; Plus Interior Finish	0.25	127	160	0
12E-5sw	Frame Wall or Partition; Wood Framing; R-19 Insulation in 2 x 6 Stud Cavity; Stucco or Wood Siding; Plus Interior Finish	0.05	167	44	0
12E-5sw	Frame Wall or Partition; Wood Framing; R-19 Insulation in 2 x 6 Stud Cavity; Stucco or Wood Siding; Plus Interior Finish	0.05	249	539	0

Doors

Code	Description	U-Value	Area	Heating	Cooling
11P	Metal Door with Polyurethane Core	0.29	67	851	0
11P	Metal Door with Polyurethane Core	0.29	20	197	0

Floors

Code	Description	U-Value	Area	Heating	Cooling
22D-15-r	22D - Vertical Board Insulation Covers Slab Edge, Turns Under the Slab and Extends Four Feet Horizontally, any Floor Cover	0.07	23 (P)	120	0
22D-15-r	22D - Vertical Board Insulation Covers Slab Edge, Turns Under the Slab and Extends Four Feet Horizontally, any Floor Cover	0.07	38 (P)	291	0
22D-15-r	22D - Vertical Board Insulation Covers Slab Edge, Turns Under the Slab and Extends Four Feet Horizontally, any Floor Cover	0.07	103 (P)	1,170	0
22D-15-r	22D - Vertical Board Insulation Covers Slab Edge, Turns Under the Slab and Extends Four Feet Horizontally, any Floor Cover	0.07	32 (P)	130	0

Ceilings

Code	Description	U-Value	Area	Heating	Cooling
16C-38ml	FHA vented attic; No radiant barrier over ceiling or same type of air space behind an attic knee wall; Materials: Asphalt Shingles(a), Metal(m), Wood Shakes(w), Tar / Gravel(x), Membrane(z); Colors: Light(l), White(w);	0.03	1,789	2,017	0

Glazing

Windows

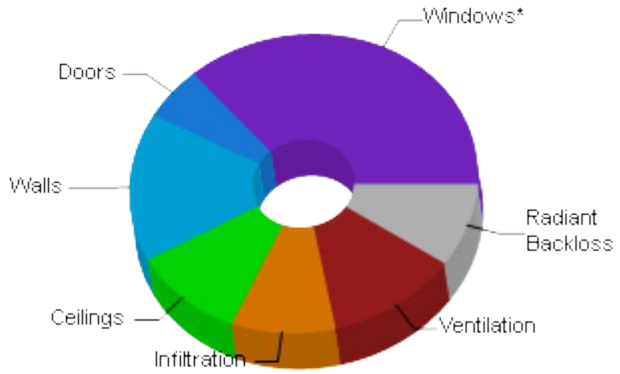
Code	Description	Exposure	U-Value	SHGC	Area	Heating	Cooling
10Bf	French Door with Double Pane Clear Glass and Insulated Fiberglass Frame, BlindsMedium45 (50%), 4', 1'-6" above., GreenGrass	S	0.48	0.39	34	727	0
1D-cf	Double pane operable window or sliding glass door, with Clear Glass - Insulated Fiberglass Framing, BlindsMedium45 (50%), 4', 1'-6" above., GreenGrass	E	0.49	0.56	50	1,073	0
1D-cf	Double pane operable window or sliding glass door, with Clear Glass - Insulated Fiberglass Framing, BlindsMedium45 (50%), 4', 1'-6" above., GreenGrass	N	0.49	0.56	10	165	0
1D-cf	Double pane operable window or sliding glass door, with Clear Glass - Insulated Fiberglass Framing, BlindsMedium45 (50%), 4', 1'-6" above., GreenGrass	S	0.49	0.56	200	4,302	0
1D-cf	Double pane operable window or sliding glass door, with Clear Glass - Insulated Fiberglass Framing, BlindsMedium45 (50%), 4', 1'-6" above., GreenGrass	N	0.49	0.56	30	646	0

Load Breakdown

Name	Heating	Sensible	Latent
Windows*	6,913	0	
Skylights*	0	0	
Doors	1,048	0	
Walls	3,038	0	
Below Grade Walls	0		
Ceilings	2,017	0	
Floors	0	0	
Infiltration	1,816	0	0
Internal		0	0
Other	0		
Duct Loads	0	0	0
Ventilation	2,270	0	0
Humidification	0		
Piping Load	0		
Radiant Backloss	1,710		
Blower Heat		0	
AED*		0	
Total	18,811	0	0
Total Area	1,789 ft²	0 ft²	

*Average Load Procedure

Heating Load Breakdown



Heating Zones

Zone	Area	Room Temp	Total Load
Zone 101	1,213	70	12,866
Zone 102	327	70	3,202
Zone 103	137	70	1,317
Zone 104	112	60	1,427

Heating Rooms

Room	Area	Room Temp	Total Load
Great Room Zone	1,213	70	12,866
Master Bathroom Zone	137	70	1,317
Master Bedroom Zone	327	70	3,202
Utility Room Zone	112	60	1,427

Design Locaton

Location:	Rogue River, Evans Creek Valley	Altitude:	1550' ft
Province/State:	Oregon	Latitude:	42.4
Country:	United States	Wet Bulb Temperature:	66.0 °F
Outdoor Heating Design Temp:	26.0 °F	Daily Range:	High
Outdoor Cooling Design Temp:	95.0 °F		

MJ8Custom

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Form J1

Manual J8 Load Calculation

Project #:Sunny Falls Ranch

June 19, 2015

Project Information

Project #: Sunny Falls Ranch

Name: Passive Solar & HR Heated Residence

Location: 19000 E. Evans Creek Rd., Rogue River, OR 97537

Notes:

Form J1 (Summer)

1	Name of Room				Passive Solar & HR Heated Residence		Entire House			
2	Running Feet of Exposed Wall						165			
3	Ceiling Height (Ft) and Gross Wall Area (SqFt)						9.7	2,189		
4	Room Dimensions (Ft) and Floor Plan Area (SqFt)							1,789		
5	Ceiling Slope (Deg.) and Gross Ceiling Area (SqFt)							1,789		
	Type of Exposure		Construction Number	Panel Faces	HTM		Area or Length	Btuh		
					Htg.	Clg.		Heating	S-Clg.	L-Clg.
6a	Windows and Glass Doors	a	10Bf	S	21.12		34.41	727		
		b	1D-cf	E	21.56		49.79	1,073		
		c	1D-cf	N	16.66		9.89	165		
		d	1D-cf	S	21.56		200	4,302		
		e	1D-cf	N	21.56		29.95	646		
6b	Skylights	a								
7	Wood and Metal Doors	a	11P		12.76		66.67	851		
		b	11P		9.86		20.00	197		
8	Above Grade Walls and Partitions	a	14D-24		1.50		1,235	2,294		
		b	12A-0bw(Partition)				127	160		
		c	12E-5sw(Partition)				167	44		
		d	12E-5sw(Partition)				249	539		
9	Below Grade Walls	a								
10	Ceilings	a	16C-38ml				1,789	2,017		
11	Floors	a	22D-15-r		0.88		23 (P)	120		
		b	22D-15-r		0.89		38 (P)	291		
		c	22D-15-r		0.96		103 (P)	1,170		
		d	22D-15-r		1.16		32 (P)	130		
12	Infiltration	Heating Load (Btuh)			Effect ACH	0.140	WAR 1.0	1,816		
		Sensible Load (Btuh)								
		Latent Load (Btuh)								
13	Internal	a	Occupants at 230 and 200 Btuh				2			
		b	Scenario Number				Def			
		c	Default Adjustments							
		d	Custom Appliances							
		e	Plants							
	Other	User specified additional loads								
14	Subtotals	Sum lines 6 through 13						16,541		
15	Duct Loads	EHLF & ESGF								
		ELG								
16	Ventilation Loads	Vent Cfm		101 / 0	E Cfm	101 / 0		2,270		
17	Winter Humidification Load				Gal/Day					
18	Piping Load									
19	Blower Heat									
20	AED Excursion									
21	Total Load	Sum lines 13 through 19						18,811		

All load values shown in Btu/hr

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Version:15.0.0594

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Manual J Worksheets

Manual J8 Load Calculation

Project #:Sunny Falls Ranch

June 19, 2015

Project Information

Project #: Sunny Falls Ranch

Name: Passive Solar & HR Heated Residence

Location: 19000 E. Evans Creek Rd., Rogue River, OR 97537

Notes:

Form J1 (Summer)

1	Name of Room				Passive Solar & HR Heated Residence		Entire House			
2	Running Feet of Exposed Wall						165			
3	Ceiling Height (Ft) and Gross Wall Area (SqFt)					9.7	2,189			
4	Room Dimensions (Ft) and Floor Plan Area (SqFt)						1,789			
5	Ceiling Slope (Deg.) and Gross Ceiling Area (SqFt)						1,789			
Type of Exposure			Construction Number	Panel Faces	HTM		Area or Length	Btuh		
					Htg.	Clg.		Heating	S-Clg.	L-Clg.
6a	Windows and Glass Doors	a	10Bf	S	21.12		34.41	727		
		b	1D-cf	E	21.56		49.79	1,073		
		c	1D-cf	N	16.66		9.89	165		
		d	1D-cf	S	21.56		200	4,302		
		e	1D-cf	N	21.56		29.95	646		
6b	Skylights	a								
7	Wood and Metal Doors	a	11P		12.76		66.67	851		
		b	11P		9.86		20.00	197		
8	Above Grade Walls and Partitions	a	14D-24		1.50		1,235	2,294		
		b	12A-0bw(Partition)				127	160		
		c	12E-5sw(Partition)				167	44		
		d	12E-5sw(Partition)				249	539		
9	Below Grade Walls	a								
10	Ceilings	a	16C-38ml				1,789	2,017		
11	Floors	a	22D-15-r		0.88		23 (P)	120		
		b	22D-15-r		0.89		38 (P)	291		
		c	22D-15-r		0.96		103 (P)	1,170		
		d	22D-15-r		1.16		32 (P)	130		
12	Infiltration	Heating Load (Btuh)			Effect ACH	0.140	WAR 1.0	1,816		
		Sensible Load (Btuh)								
		Latent Load (Btuh)								
13	Internal	a	Occupants at 230 and 200 Btuh				2			
		b	Scenario Number				Def			
		c	Default Adjustments							
		d	Custom Appliances							
		e	Plants							
	Other	User specified additional loads								
14	Subtotals	Sum lines 6 through 13						16,541		
15	Duct Loads	EHLF & ESGF								
		ELG								
16	Ventilation Loads	Vent Cfm		101 / 0	E Cfm	101 / 0		2,270		
17	Winter Humidification Load				Gal/Day					
18	Piping Load									
19	Blower Heat									
20	AED Excursion									
21	Total Load	Sum lines 13 through 19						18,811		

All load values shown in Btu/hr

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Version:15.0.0594

See sections at end of report for important Notes, Assumptions and Disclaimers.

Worksheet A Location And Design Conditions					
Location: (User Specified) Rogue River, Evans Creek Valley,Oregon		**Elevation:** 1,550 ft		**Latitude:** 42.4	
Indoor Conditions, Heating:	DB = 70.0 °F	RH = 35%	**Indoor Conditions, Cooling:**	DB = 75.0 °F	RH = 50%
Table 1 Conditions	99% DB = 26.0 °F	1% DB = 95.0 °F	**Grains Difference** = -13.7	**Daily Range** = High	
Design Temperature Differences		HTD = 44.0 °F		CTD = 20.0 °F	

Worksheet B
HTM Values for Windows and Glass Doors
Passive Solar & HR Heated Residence

Panel	Const. Number	Internal Shade	Faces	U-Value	SHGC	Insect Screen	External Shading	Overhang	Heat HTM	Cool HTM
a	10Bf	BlindsMedium45(50%)	S	0.480	0.39	None	1.00	4 ft-1.5 ft Above	21.12	0.00
b	1D-cf	BlindsMedium45(50%)	E	0.490	0.56	None	1.00	4 ft-1.5 ft Above	21.56	0.00
c	1D-cf	BlindsMedium45(50%)	N	0.490	0.56	None	1.00	4 ft-1.5 ft Above	16.66	0.00
d	1D-cf	BlindsMedium45(50%)	S	0.490	0.56	None	1.00	4 ft-1.5 ft Above	21.56	0.00
e	1D-cf	BlindsMedium45(50%)	N	0.490	0.56	None	1.00	4 ft-1.5 ft Above	21.56	0.00

Worksheet C
HTM Values for Skylights
Passive Solar & HR Heated Residence

Item	Const. Number	Internal Shading	Tilt	Faces	U-Value	SHGC	Description	Perimeter	Area	Ueff	Heating HTM	Cooling HTM

Worksheet D
HTM Values and Net Area for Opaque Panels
Passive Solar & HR Heated Residence

Construction Number and Exposure Direction, or Ceiling Slope		HTD = 44.0 °F		CTD = 20.0 °F		Design Range = High			Heating HTM = U x HTD or U x PTDH Cooling HTM = U x CLTD or U x PTDC				
		Length (Ft)	Average Height/ Width (Ft)	Gross Area (SqFt)	Opening Area (SqFt)	Net Area (SqFt)	Slab Edge (Ft)	U-Value or Slab F-Value 4A	HTD or PTDH	Group Number 4A	CLTD 4B or PTDC	Heating HTM	Cooling HTM
Wood and Metal Doors													
a	11P	10	7	66.67				0.290	44.0		0.0	12.76	0.00
b	11P	3	7	20.00				0.290	34.0		0.0	9.86	0.00
Above Grade Walls													
a	14D-24	165	10	1,592	357	1,235		0.044	44.0	K		1.50	0.00
Partition Walls													
a	12A-0bw(Partition)	13	10	127		127		0.253	10.0	E		0.00	0.00
b	12E-5sw(Partition)	17	10	167		167		0.052	10.0	H		0.00	0.00
c	12E-5sw(Partition)	31	10	303	53.33	249		0.052	44.0	H		0.00	0.00
Below Grade Walls													
Ceilings													
a	16C-38ml			1,789		1,789		0.026	44.0			0.00	0.00
Passive Floors													
Radiant Floors													
a	22D-15-r			137			23	0.401	69.0			0.88	0.00
b	22D-15-r			327			38	0.401	69.0			0.89	0.00
c	22D-15-r			1,213			103	0.401	69.0			0.96	0.00
d	22D-15-r			112			32	0.401	59.0			1.16	0.00

Worksheet E
Infiltration Loads

HTD = 44.0 °F	CTD = 20.0 °F	Design Grains = -13.7	Elevation = 1,550 ft	Table 10A ACF = 0.93

Step 1 - Table 8 Outdoor Air Requirement

Operating Mode	Above Grade Volumne AGV (CuFt)	Number of Bed Rooms	Number of People	Default Burner Btuh	Installed Burner Btuh	OA Cfm for 0.35 ACH	OA Cfm for People	OA Cfm for Furnace	Table 8 OA Cfm
Heat	17,290		2	0		101	40	50	101
Cool	0		2			0	40		101

Step 2, Option 1 - Table 5 Defaults

Operating Mode	Floor Area (CuFt)	Type of Const.	Space ACH	AGV (CuFt)	Space ICFM	Fireplace ICFM	Total ICFM		Table 8 OA CFM	Table 8 Vent CFM
Heating	1,789	Tight	0.14	17,290	40	0	40		101	101
Cooling		Tight	0.11	0	0		0			

Step 3 - Infiltration Loads on Central Equipment

Type of Load	Worksheet H Value for Vent CFM	Exhaust CFM	CFM_{lmb}	ICFM (Option 1)	Net Infilt. CFM NCFM	H & C Loads (Btuh)		
Heat Load	101	101	0	40	40	1,816		
Sens Load	0	0	0	0	0			
Lat Load								

The room infiltration load equals the load on the central equipment multiplied by the gross wall area ratio (WAR)
WAR = Gross room wall area / Gross wall area for all rooms served by the central equipment

Worksheet F
Internal Loads

	Source of Internal Load	Count	Sensible Factor (Btuh)	Latent Factor (Btuh)	Load Factor	Use Factor	Sensible Load	Latent Load
a	Occupants	2	230	200	1.0	1.0		
						Total occupancy load for Form J1 (Btuh) =		
b	Default Scenario							
	Default (1,200 Btuh)	1			1.0	1.0		
						Default scenario load for Form J1 (Btuh) =		
c	Adjustments to Default Scenario							
	None							
						Total adjustment options for Form J1 (Btuh) =		
d	Individual Appliance Options							
	None							
						Total individual appliance load for Form J1 (Btuh) =		
e	Plants							
	Small	0	10					
	Medium	0	20					
	Large	0	30					
						Total plant load for Form J1 (Btuh) =		

Consider diversity; Load Factor = Average input / Rated or Nameplate Input; Use Factor = Percent operating time for one hour

Worksheet H
Ventilation Loads
Passive Solar & HR Heated Residence

Type of Load	VCFM or CFM_{dish}	SER LER for Heat Recovery Ventilator	Condition of Air Leaving Ventilation Dehumidifer		For VDH Only Indoor Grains for Site Elevation	Table 1 Outdoor Condition T_o and Grains	HTD and CTD From Wrksht A	LAT_{loss} LAT_{gain} V-Grains for Ventilation air	Site Elevation 1,550 Table 10A ACF	Ti Indoor Drybulb	Vent. Loads (Btuh)
Heat Load	101	0.5	LAT_{VDH}		Table 12	26.0 °F	44.0 °F	48.0	0.93	70.0	2,270
Sen Load	0	0.5	LAT_{VDH}			95.0 °F	20.0 °F			75.0	
Lat Load		0	$Grain_{VDH}$			-13.7		0.0			

Worksheet I
Ancillary Loads
Passive Solar & HR Heated Residence

Winter Humidification Heating Load

Indoor Conditions		Table 1 Values		Table 10A ACF	Table 12 Grains		Outdoor CFM			Humid H-Load (Btuh)	Gallons Per Day
Dy Bulb	Relative Humidity	Winter Dry Bulb	Site Elevation		Outdoor ODGR	Indoor IDGR	Net Infilt. NCFM	Vent VCFM	Total TCFM		
70.0	35%	26.0	1,550	0.93	16.9	40.2	40	101	141		0.0

Heat of evaporation provided by central heating equipment.
Humidification (RH Value) shall not cause visible or concealed condensation (per Section 27 procedures).

Heating Load = 0.68 x TCFM x (IDGR - ODGR) x ACF
Gallons Per Day = 0.00272 x Heating Load

Hot Water Piping Load

Size/Type	Feet of Pipe L_i	Water Temp. T_w°F	Ambient Temp. T_a°F	Wall TD WTD_i	Table 9 Factor $F9_i$	Piping Load PL_i
					System Total	

$WTD = T_w - T_a$
$PL_i = 1.1 \times L_i \times WTD_i \times F9_i$
System Total (Btuh) = Sum PL_i

Blower Motor Load

Manufacturer's Sensible Capacity Data not Adjusted for Blower Heat	Blower Motor Power from Manufacturer's Blower Table			Default Power	Default Load	Sensible Load
	Watts	KW	HP	Watts	Btuh	Btuh
				0		

Sensible Load = 3.413 x watts
Sensible Load = 3,413 x KW
Sensible Load = 3,600 x HP

Moisture Migration Load

Moisture will migrate through porous ceiling, wall, and floor materials that are not protected by a vapor retarding membrane. The latent moisture migration load for summer cooling may be an important issue if the structure does not have an appropriate vapor retarding membrane for the local summer climate. For winter humidification, moisture migration may cause visible or concealed condensation, mold, mildew, and structural damage. See the full version of Manual J, Section 28 for basic guidance. Contact the Energy Efficient Building Association (EEBA) for comprehensive guidance pertaining to membrane need and use. See the 2012 ASHRAE Handbook of Fundamentals, Chapter 25 and Chapter 26. Compare local code with EEBA/ASHRAE guidance. Incompatibilities require the attention of the local code authority. Joe Lstiburek is the primary authority on this issue (obtain contact info from the EEBA, ASHRAE, or internet search).

Room Loads
Passive Solar & HR Heated Residence

Room	Heat Load (Btuh)	Sens Load (Btuh)
Master Bathroom Zone	1,197	
Master Bedroom Zone	2,911	
Great Room Zone	11,696	
Utility Room Zone	1,298	

*Average Load Procedure
Room loads do not include radiant panel back loss

Total Heating: 18,811 **Total Sensible: 0** **Total Latent: 0**

Name	Heating	Sensible	Latent
Windows*	6,913	0	
Skylights*	0	0	
Doors	1,048	0	
Walls	3,038	0	
Below Grade Walls	0		
Ceilings	2,017	0	
Floors	0	0	
Infiltration	1,816	0	0
Internal		0	0
Duct Loads	0	0	0
Ventilation	2,270	0	0
Humidification	0		
Piping Load	0		
Radiant Backloss	1,710		
Recovered Backloss	0		
Blower Heat		0	
AED*		0	
Total Load	**18,811**	**0**	**0**
Total Area	**1,789 ft²**	**0 ft²**	

*Average Load Procedure, Glazing Area > 15% of floor area

Constructions

Walls

Code	Description	U-Value (btu/hr·ft²·°F)
14D-24	Foam Concrete Matrix - R-22 to R-26; No Cavity Insulation; Plus Interior Finish	0.044
12A-0bw(Partition)	Frame Wall or Partition; Wood Framing; No Cavity Insulation; Brick Veneer; Plus Interior Finish	0.253
12E-5sw(Partition)	Frame Wall or Partition; Wood Framing; R-19 Insulation in 2 x 6 Stud Cavity; Stucco or Wood Siding; Plus Interior Finish	0.052

Doors

Code	Description	U-Value (btu/hr·ft²·°F)
11P	Metal Door with Polyurethane Core	0.290

Floors

Code	Description	U-Value (btu/hr·ft²·°F)
22D-15-r	22D - Vertical Board Insulation Covers Slab Edge, Turns Under the Slab and Extends Four Feet Horizontally, any Floor Cover	0.067

Ceilings

Code	Description	U-Value (btu/hr·ft²·°F)
16C-38ml	FHA vented attic; No radiant barrier over ceiling or same type of air space behind an attic knee wall; Materials: Asphalt Shingles(a), Metal(m), Wood Shakes(w), Tar / Gravel(x), Membrane(z); Colors: Light(l), White(w);	0.026

Glazings

Windows

Code	Description	U-Value (btu/hr·ft²·°F)
10Bf	French Door with Double Pane Clear Glass and Insulated Fiberglass Frame (SHGC = 0.39)	0.480
1D-cf	Double pane operable window or sliding glass door, with Clear Glass - Insulated Fiberglass Framing (SHGC = 0.56)	0.490

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Heating System Summary

Project #:Sunny Falls Ranch
June 19, 2015

Project Information

Project #: Sunny Falls Ranch
Name: Passive Solar & HR Heated Residence
Location: 19000 E. Evans Creek Rd., Rogue River, OR 97537

Notes:

Project Summary

Load Calculation Method:	Manual J8	Total Tubing Lengths:		Component Losses:	13,015 Btu/hr
Design Location:	(User Specified) Rogue River, Evans Creek Valley, Oregon	hePEX 1/2"	1,641 ft	Infiltration/Ventilation:	4,086 Btu/hr
				Radiant Back Losses:	1,710 Btu/hr
Outdoor Temperature:	26.0 °F	Total RH Circuits:	8	Total Heating Load:	18,811 Btu/hr
Floorplans / Levels:		Total Manifolds:	1		
Ground Floor	1,789 ft²	Total Zones:	4	Radiant Heating:	17,101 Btu/hr
Total Area:	1,789 ft²			Radiant Back Losses:	1,710 Btu/hr
		Fluid Type:	100% Water	Total Heating Load:	18,811 Btu/hr
		Total Tubing Volume:	15.10 USG		

Zone Heating Summary

Zone #	Area	Construction	Heating Types	RH Circuits	Total Tubing	Manifolds	Flowrate	Head Loss	RH Load	Supplemental	Total Load
101	1,213	Embedded Slab	RH	4	917	1	1.70	3.1	12,725	0	12,866
102	327	Embedded Slab	RH	2	428	1	0.46	1.0	3,202	0	3,202
103	137	Embedded Slab	RH	1	175	1	0.17	0.6	1,294	0	1,317
104	112	Embedded Slab	RH	1	120	1	0.19	0.5	1,427	0	1,427
Total	1,789	Embedded Slab	RH	8	1,641	1	2.52	3.1	18,811	0	18,811

Length = ft Area = ft² Temperature = °F Flowrate = USGPM Heat Loss = Btu/hr Unit Heat Loss = Btu/hr·ft² Rv = hr·ft²·°F/btu
Head Loss = ft water RH = Radiant Floor Heating BB = Baseboard FA = Forced Air OTH = Other Heating SM = Snowmelt N = Not Heated

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Room Heating Summary (By Construction Type)

Embedded Slab

Zone #	Room Name	Heating Type	Area	Heated Area	Manifold #	Tube Size	RH Circuits	Tube Spacing	Total Tubing	Floor Cover RV	Required Temp.	Unit RH Load	RH Load	Supplemental	Total Load
101	Great Room Zone	RH	1,213	901	Manifold 1	1/2	4	12	893	0.2	89	11	12,866	0	12,866
102	Master Bedroom Zone	RH	327	308	Manifold 1	1/2	2	12	415	0.2	84	10.4	3,202	0	3,202
103	Master Bathroom Zone	RH	137	58	Manifold 1	1/2	1	6	169	0.2	90	10.6	1,317	0	1,317
104	Utility Room Zone	RH	112	85	Manifold 1	1/2	1	12	114	0.2	81	14.3	1,427	0	1,427

RH Manifold Summary

Manifold Name	# Zones	# Circuits	Flowrate	Head Loss	Required Temp.	Supplied Temp.	Temp Drop	Manifold Type	Control Type	# Actuators
Manifold 1	4	8	2.52	3.1	90	93	15 (22)	Stainless-steel, 1" with flow meter, B&I, ball valve	Circuit	8
Total	4	8	2.52	3.1	90	-	-	-	-	8

Disclaimers

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Email:sunnyfallsrb@gmail.com

Heating System Detail

Project #:Sunny Falls Ranch
June 19, 2015

Project Information

Project #: Sunny Falls Ranch
Name: Passive Solar & HR Heated Residence
Location: 19000 E. Evans Creek Rd., Rogue River, OR 97537

Notes:

Design Conditions and Summary

Load Calculation Method:	Manual J8
Design Location:	(User Specified) Rogue River, Evans Creek Valley, Oregon
Outdoor Temperature:	26.0 °F
Floorplans / Levels:	
Ground Floor	1,789 ft²
Total Area:	1,789 ft²

Total Tubing Lengths:	
hePEX 1/2"	1,641 ft
Total RH Circuits:	8
Total Manifolds:	1
Total Zones:	4
Fluid Type:	100% Water
Total Tubing Volume:	15.10 USG

Component Losses:	13,015 Btu/hr
Infiltration/Ventilation:	4,086 Btu/hr
Radiant Back Losses:	1,710 Btu/hr
Total Heating Load:	18,811 Btu/hr
Radiant Heating:	17,101 Btu/hr
Radiant Back Losses:	1,710 Btu/hr
Total Heating Load:	18,811 Btu/hr

Zone Heating Summary

Zone #	Area	Heating Types	RH Circuits	Flowrate	Head Loss	Supplemental	Rooms
101	1,213	RH	4	1.70	3.1	0	Great Room Zone
102	327	RH	2	0.46	1.0	0	Master Bedroom Zone
103	137	RH	1	0.17	0.6	0	Master Bathroom Zone
104	112	RH	1	0.19	0.5	0	Utility Room Zone
Total	1,789	RH	8	2.52	3.1	0	

Length = ft Area = ft² Temperature = °F Flowrate = USGPM Heat Loss = Btu/hr Unit Heat Loss = Btu/hr·ft² Rv = hr·ft²·°F/btu
Head Loss = ft water RH = Radiant Floor Heating BB = Baseboard FA = Forced Air OTH = Other Heating SM = Snowmelt N = Not Heated

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Room Heating Summary

Ground Floor

Great Room Zone

Total Area:	1,213	ft²	Radiant Heating:			Load/Loss Summary:	
Heated by:	RH		Heated Area:	901	ft²	**Room Design Load:**	11,696 Btu/hr
Room Temperature:	70	°F	Tubing in Floor:	917	ft		
Floor Covering (Rv):	0.2 - Tile		Circuits in Room:	4		Radiant Load:	12,866 Btu/hr
			Tube Spacing:	12		Baseboard Load:	0 Btu/hr
			Required Surface Temp:	76	°F	Forced Air Load	0 Btu/hr
			Required Water Temp:	89	°F	Other Load:	0 Btu/hr
			Est. Peak Output:	14,210	Btu/hr		
						Radiant Back Loss:	1,170 Btu/hr
						Recovered Back Loss:	0 Btu/hr
						Total Heat Loss:	12,866 Btu/hr

Master Bathroom Zone

Total Area:	137	ft²	Radiant Heating:			Load/Loss Summary:	
Heated by:	RH		Heated Area:	58	ft²	**Room Design Load:**	1,197 Btu/hr
Room Temperature:	70	°F	Tubing in Floor:	175	ft		
Floor Covering (Rv):	0.2 - Tile		Circuits in Room:	1		Radiant Load:	1,317 Btu/hr
			Tube Spacing:	6		Baseboard Load:	0 Btu/hr
			Required Surface Temp:	80	°F	Forced Air Load	0 Btu/hr
			Required Water Temp:	90	°F	Other Load:	0 Btu/hr
			Est. Peak Output:	1,345	Btu/hr		
						Radiant Back Loss:	120 Btu/hr
						Recovered Back Loss:	0 Btu/hr
						Total Heat Loss:	1,317 Btu/hr

Master Bedroom Zone

Total Area:	327	ft²	Radiant Heating:			Load/Loss Summary:	
Heated by:	RH		Heated Area:	308	ft²	**Room Design Load:**	2,911 Btu/hr
Room Temperature:	70	°F	Tubing in Floor:	428	ft		
Floor Covering (Rv):	0.2 - Tile		Circuits in Room:	2		Radiant Load:	3,202 Btu/hr
			Tube Spacing:	12		Baseboard Load:	0 Btu/hr
			Required Surface Temp:	75	°F	Forced Air Load	0 Btu/hr
			Required Water Temp:	84	°F	Other Load:	0 Btu/hr
			Est. Peak Output:	4,311	Btu/hr		
						Radiant Back Loss:	291 Btu/hr
						Recovered Back Loss:	0 Btu/hr
						Total Heat Loss:	3,202 Btu/hr

Outdoor Porch

Total Area:	125	ft²	Radiant Heating:			Load/Loss Summary:	
Heated by:	NH		Heated Area:	115	ft²	**Room Design Load:**	0 Btu/hr
Room Temperature:	26	°F	Tubing in Floor:	0	ft		
Floor Covering (Rv):	0.0 - Unfinished Slab		Circuits in Room:	0		Radiant Load:	0 Btu/hr
			Tube Spacing:	12		Baseboard Load:	0 Btu/hr
			Required Surface Temp:	26	°F	Forced Air Load	0 Btu/hr
			Required Water Temp:	118	°F	Other Load:	0 Btu/hr
			Est. Peak Output:	0	Btu/hr		
						Radiant Back Loss:	0 Btu/hr
						Recovered Back Loss:	0 Btu/hr
						Total Heat Loss:	0 Btu/hr

Utility Room Zone

Total Area:	112	ft²	Radiant Heating:			Load/Loss Summary:	
Heated by:	RH		Heated Area:	85	ft²	**Room Design Load:**	1,298 Btu/hr
Room Temperature:	60	°F	Tubing in Floor:	120	ft		
Floor Covering (Rv):	0.2 - Tile		Circuits in Room:	1		Radiant Load:	1,427 Btu/hr
			Tube Spacing:	12		Baseboard Load:	0 Btu/hr
			Required Surface Temp:	68	°F	Forced Air Load	0 Btu/hr
			Required Water Temp:	81	°F	Other Load:	0 Btu/hr
			Est. Peak Output:	1,924	Btu/hr		
						Radiant Back Loss:	130 Btu/hr
						Recovered Back Loss:	0 Btu/hr
						Total Heat Loss:	1,427 Btu/hr

Radiant Heating Details

Manifold Summary

Manifold Name	# Zones	# Circuits	Flowrate	Head Loss	Required Temp.	Supplied Temp.	Temp Drop	Manifold Type	Control Type	# Actuators
Manifold 1	4	8	2.52	3.1	90	93	15 (22)	Stainless-steel, 1" with flow meter, B&I, ball valve	Circuit	8
Total	4	8	2.52	3.1	90	-	-	-	-	8

Tubing Circuit Details

Manifold 1

Circuit	Rooms Served	Total Length	Tube Spacing	Area Covered	Tubing	Flowrate	Head Loss**	Temp Drop	Load	Actuator
A-1	Great Room Zone	242	12	250	hePEX 1/2"	0.48	2.9	15 (17)	3,572	Yes
A-2	Great Room Zone	219	12	212	hePEX 1/2"	0.40	2.0	15 (18)	3,025	Yes
A-3	Great Room Zone	232	12	206	hePEX 1/2"	0.39	2.0	15 (18)	2,946	Yes
A-4	Great Room Zone	224	12	223	hePEX 1/2"	0.43	2.2	15 (18)	3,182	Yes
A-5	Master Bedroom Zone	219	12	153	hePEX 1/2"	0.21	0.7	15 (22)	1,603	Yes
A-6	Master Bedroom Zone	209	12	166	hePEX 1/2"	0.24	0.8	15 (22)	1,762	Yes
A-7	Master Bathroom Zone	175	6	57	hePEX 1/2"	0.17	0.4	15 (17)	1,294	Yes
A-8	Utility Room Zone	120	12	85	hePEX 1/2"	0.19	0.3	15 (22)	1,427	Yes
Total	-	1,641		1,352	-	2.52	2.9		18,811	8

** Head loss for circuit tubing only

Disclaimers

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Cold weather humidification, or some lifestyles that produce excessive moisture, may cause condensation to occur if the absolute humidity of the indoor air is too high for the momentary circumstances. Condensation can occur on surfaces or concealed within the structure, and can lead to mold, mildew, frost damage, and moisture damage. The software does not perform calculations for the estimation or detection of possible condensation problems, and it is the designers (i.e. software users) responsibility to do so independently if required. For guidance and additional cautions refer to ACCA Manual J 8th Edition, including Section 1-11 and Section 27.

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Rogue River, OR 97537
Phone: 541-826-7222
Email:sunnyfallsrb@gmail.com

Radiant Panel Schedule

Project #:Sunny Falls Ranch
June 19, 2015

Project Information

Project #: Sunny Falls Ranch
Name: Passive Solar & HR Heated Residence
Location: 19000 E. Evans Creek Rd., Rogue River, OR 97537

Notes:

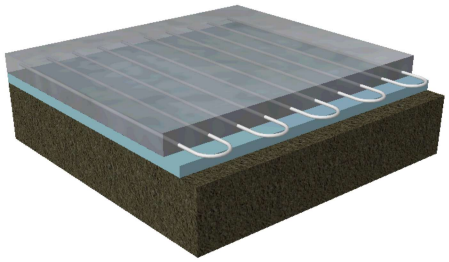
Design Conditions and Summary

Load Calculation Method:	Manual J8	Component Losses:	13,015 Btu/hr
Design Location:	(User Specified) Rogue River, Evans Creek Valley, Oregon	Infiltration/Ventilation:	4,086 Btu/hr
		Radiant Back Losses:	1,710 Btu/hr
Outdoor Temperature:	26.0 °F	Total Heating Load:	18,811 Btu/hr
Floorplans / Levels:			
Ground Floor	1,789 ft²	Radiant Heating:	17,101 Btu/hr
Total Area:	1,789 ft²	Radiant Back Losses:	1,710 Btu/hr
		Total Heating Load:	18,811 Btu/hr

Radiant Panel Details

Panel Type #1 - Embedded Slab

Slab Thickness:	4.0 in
Tube Depth:	2.5 in
Slab R per Inch:	0.15 °F•ft²•hr/Btu•in
Spacing:	6 in, 12 in
Fastener:	2 Foam Staples
Floorplans:	
Ground Floor	1,707 ft²



Note: Tube depth is measured from top of embedded layer to the centerline of the tubing.

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Water Supply Summary

Project #:Sunny Falls Ranch
June 19, 2015

Project Information

Project #: Sunny Falls Ranch
Name: Passive Solar & HR Heated Residence
Location: 19000 E. Evans Creek Rd., Rogue River, OR 97537

Notes:

Supply Summary

Name	Temp	Total Flow	Head Loss*	# Circuits	Load	# Zones
Water Temperature	93.0	2.52	3.1	8	18,811	4

* may contain additional head loss from manifold body and control valves

Water Temperature (93 °F)

Manifold 1 (93 °F, Stainless-steel, 1" with flow meter, B&I, ball valve, 8 Circuits)

Circuit	Rooms Served	Total Length	Tube Spacing	Area Covered	Tubing	Flowrate	Head Loss**	Temp Drop	Load	Actuator
A-1	Great Room Zone	242	12	250	hePEX 1/2"	0.48	2.9	15 (17)	3,572	Yes
A-2	Great Room Zone	219	12	212	hePEX 1/2"	0.40	2.0	15 (18)	3,025	Yes
A-3	Great Room Zone	232	12	206	hePEX 1/2"	0.39	2.0	15 (18)	2,946	Yes
A-4	Great Room Zone	224	12	223	hePEX 1/2"	0.43	2.2	15 (18)	3,182	Yes
A-5	Master Bedroom Zone	219	12	153	hePEX 1/2"	0.21	0.7	15 (22)	1,603	Yes
A-6	Master Bedroom Zone	209	12	166	hePEX 1/2"	0.24	0.8	15 (22)	1,762	Yes
A-7	Master Bathroom Zone	175	6	57	hePEX 1/2"	0.17	0.4	15 (17)	1,294	Yes
A-8	Utility Room Zone	120	12	85	hePEX 1/2"	0.19	0.3	15 (22)	1,427	Yes
Total	-	1,641		1,352	-	2.52	2.9		18,811	8

** Head loss for circuit tubing only

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Circuit Schedule

Project #:Sunny Falls Ranch
June 19, 2015

Project Information

Project #: Sunny Falls Ranch
Name: Passive Solar & HR Heated Residence
Location: 19000 E. Evans Creek Rd., Rogue River, OR 97537

Notes:

Stock Summary

Part Number	Description	Quantity
A1220500	1/2" Wirsbo hePEX plus, 1,000 ft. coil	1
A1260500	1/2" Wirsbo hePEX, 500 ft. coil	1
A1250500	1/2" Wirsbo hePEX plus, 300 ft. coil	1

Coil Summary

Coil	Part Number	Coil Length (ft)	Tube Type	Length Used (ft)
Coil 1	A1220500	1,000	hePEX 1/2"	993
Coil 2	A1260500	500	hePEX 1/2"	428
Coil 3	A1250500	300	hePEX 1/2"	219

Circuits Cut Schedule

Ground Floor

Circuit	Length (ft)	Location	Coil
A-1	242	Ground Floor;Manifold 1;Great Room Zone	Coil 1
A-2	219	Ground Floor;Manifold 1;Great Room Zone	Coil 3
A-3	232	Ground Floor;Manifold 1;Great Room Zone	Coil 1
A-4	224	Ground Floor;Manifold 1;Great Room Zone	Coil 1
A-5	219	Ground Floor;Manifold 1;Master Bedroom Zone	Coil 2
A-6	209	Ground Floor;Manifold 1;Master Bedroom Zone	Coil 2
A-7	175	Ground Floor;Manifold 1;Master Bathroom Zone	Coil 1
A-8	120	Ground Floor;Manifold 1;Utility Room Zone	Coil 1

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Quotation

Project #:Sunny Falls Ranch
June 19, 2015

Project Information

Project #:	Sunny Falls Ranch	Notes:	
Name:	Passive Solar & HR Heated Residence		
Location:	19000 E. Evans Creek Rd., Rogue River, OR 97537		

Quotation For

Project Summary

Load Calculation Method:	Manual J8	Total Heating Load:	18,811 Btu/hr
Design Location:	(User Specified) Rogue River, Evans Creek Valley, Oregon	Total RH Circuits:	8
Outdoor Temperature:	26.0 °F	Total Manifolds:	1
Floorplans / Levels:	1	Total Zones:	4
Total Area:	1,789 ft²		

Comments

Total Quote Price: $4,638.57

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Version:15.0.0594

Goods & Services Supplied

Other

Part Number	Description	Quantity	Unit	Price
NextGen-8	NextGen Electric Modulating Boiler with Outdoor Reset (20,478 Btu/h)	1	Ea	$1,510.00

Subtotal: $1,510.00

Fittings

Part Number	Description	Quantity	Unit	Price
Q4020500	1/2" ProPEX Fitting Assembly, R20 Thread	16	Ea	$81.40
A2700802	Stainless-steel Manifold Assembly, 1" with flow meter, B&I, ball valve, 8 loops	1	Ea	$400.73
A4020500	1/2" QS-style Compression Fitting Assembly, R20 thread	16	Ea	$106.48

Subtotal: $588.61

Tubing

Part Number	Description	Quantity	Unit	Price
A1220500	1/2" Wirsbo hePEX plus, 1,000 ft. coil	1	Ea	$639.60
A1260500	1/2" Wirsbo hePEX, 500 ft. coil	1	Ea	$319.83
A1250500	1/2" Wirsbo hePEX plus, 300 ft. coil	1	Ea	$191.90

Subtotal: $1,151.32

Controls

Part Number	Description	Quantity	Unit	Price
A3030524	Thermal Actuator for Stainless-steel Manifold, two-wire	8	Ea	$277.20
A3601012	Zoning Base Unit (C-55), 12 Zones	1	Ea	$341.17
A3601075	Zoning Interface (I-75)	1	Ea	$223.85
A3600075	Zoning Thermostat (T-75), white	4	Ea	$333.96
A3010100	Single-zone Pump Relay	1	Ea	$80.19

Subtotal: $1,256.37

Accessories

Part Number	Description	Quantity	Unit	Price
A7012000	2" Blue Foam Staples, 300/pkg.	3	Pkg	$101.48
A5500500	3/4" PVC Elbow for 3/8" and 1/2" PEX Bend Support	16	Ea	$30.80

Subtotal: $132.28

Total Quote Price: $4,638.57

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NextGen™ BOILER

Just add PEX

The NextGen Boiler is the most modern and complete electric boiler on the market.

Engineered into one attractive plug-and-play system, it includes:

- *Stainless steel heat exchanger*
- *Circulating pump*
- *Expansion tank*
- *Air vent*
- *Safety relief valve*
- *User-friendly control panel*

Radiant floor heating has never been easier for the installer.
Just add PEX!

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NextGen BOILER

Just add PEX

STANDARD FEATURES

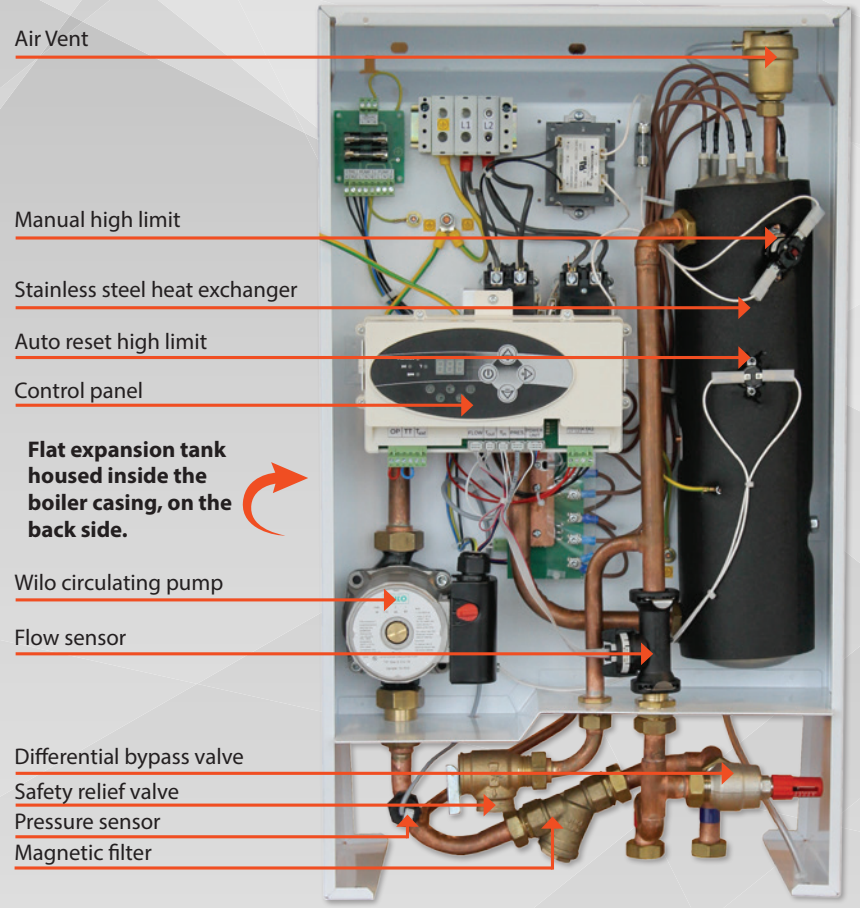
- UL listed
- 4 -14.4 kW output
- 13,652 - 49,147 BTU output
- Modulated three staged heating
- Temperature output 85°-140°F
- Stainless steel heat exchanger
- Wilo Star 21, three speed circulating pump
- Primary/secondary pump relay control
- Flat expansion tank housed inside the boiler
- Outdoor compensation/reset
- Redundant safety controls
- Automatic air vent
- Magnetic filter
- Low pressure cut off
- Off-peak capability

CONTROL PANEL FEATURES

- Inlet and outlet temperature readings
- Precise temperature control
- Flow rate reading (GPM)
- Pressure reading (psi)
- BTU output reading
- Fault code reading
- Pump exercise mode

WARRANTY INFORMATION

Kospel, S.A. warrants, and WH Response LLC carries out, the NextGen Boiler to the original purchaser to be free from manufacturing defects in materials and workmanship at the location of the original installation for a period of 26 months from the date of manufacture.



NextGen Boiler: comparison to the competition

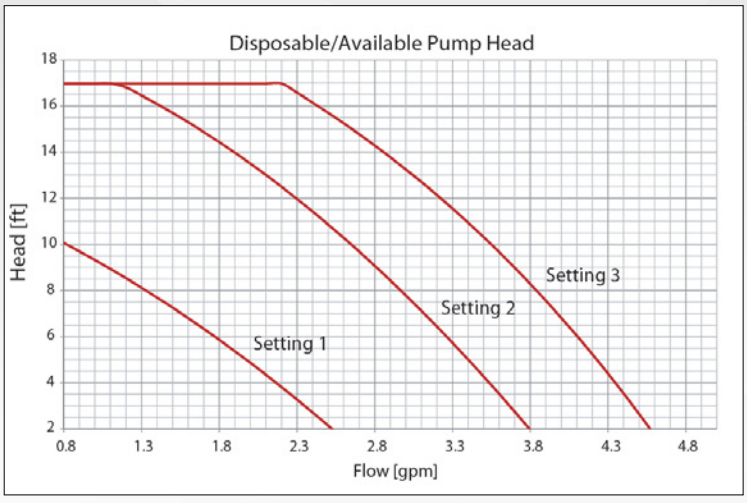
	NextGen BOILER	Competitors		
		1	2	3
Circulating Pump - Plumbed	√			
Circulator Post/Purge Operation	√		√	
Circulating Pump Exerciser	√			
Circulating Pump Switch with Auxiliary Relay	√		√	√
Expansion Tank - Plumbed	√			
Air Vent - Plumbed	√			
30 psi Relief Valve - Plumbed	√			√
Pressure Differential Valve	√			
Outdoor Compensation/Reset	√		√ upgrade	√
Digital SWT Controller	√			√
External Diagnostic Lights	√		√	√
Modulation	√	√	√	√
Digital Temperature Gauge	√			
Digital Pressure Gauge	√			
Off Peak Connections	√	√	√	√
Labor Savings	√			
Heat Exchanger Material	**Stainless Steel**	Composite Plastic	Rolled Steel	Stainless Steel

Disclaimer: While WH Response LLC strives to make this information accurate, it can make no claims or guarantees of accuracy and expressly disclaims liability for errors and omissions in the comparisons.

WHY THE NEXTGEN BOILER?

While some radiant heating installations look like science projects gone wrong, the NextGen Boiler achieves a professional installation each and every time due to its innovative and compact design. The time saved on installation labor is attractive to both the contractor and the homeowner. The NextGen Boiler is manufactured to the highest standards and will exceed expectations for many years to come.

NextGen Boiler Ratings and Specifications					
Model number	NextGen - 4	NextGen - 6	NextGen - 8	NextGen - 12	NextGen - 14.4
Boiler Rated Power	4 kW	6 kW	8 kW	12 kW	14.4 kW
	13,652 Btu/h	20,478 Btu/h	27,304 Btu/h	40,956 Btu/h	49,147 Btu/h
Voltage	240 V	240 V	240 V	240 V	240 V
Related Current	16.66 A	25.0 A	33.3 A	50.0 A	60 A
Breaker Quantity - Amps	1 @ 30 amp	1 @ 40 amp	1 @ 40 amp	2 @ 40 amp	2 @ 40 amp
Number of Heating Elements	3	3	3	3	3
Element Resistance / Each	43.3 Ω	28.8 Ω	21.6 Ω	14.4 Ω	12.0 Ω
Operating Temperature Range	85°-140° F				
Inlet / Outlet Pipe Thread	G 3/4" (internal thread)				
Expansion Vessel (14 psi.)	1.6 Gallons				
Safety relief valve rating	30 psi				
Maximum pressure	30 psi				
Minimum pressure	7 psi				
Weight	68.5 Lbs.				
Dimensions L x W x D	28" x 17" x 9 - 7/8"				
Minimum Flow Rate gpm	1.1	1.32			



Circulating pump - Wilo Star S 21 U 15.3 speed	
Circulating pump voltage	120V, 60Hz
Circulating pump Amps	.97
Speeds	3 speed
Fuse rating	1.0 amp

WH Response, LLC
U.S. National Distributor

www.nextgenboiler.com
(844) 227-9977

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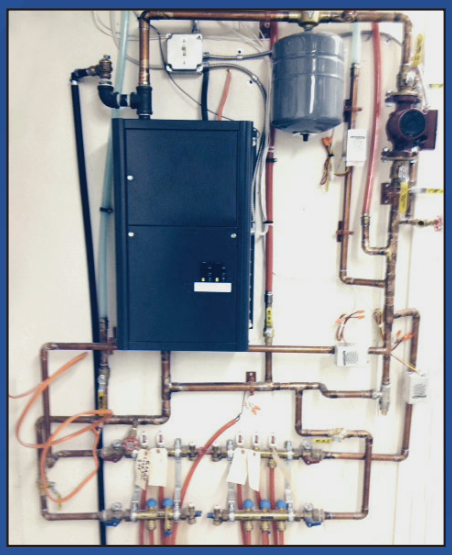
6800 Electric Drive • Rockford, MN 55373

NextGen™ BOILER

Just add PEX

The NextGen Boiler is an hydronic appliance that allows for consistent, professional installation for radiant heating applications. Take the complexity out of the mechanical room and replace it with peace of mind for the homeowner. All boiler parts and pieces (expansion tank, circulating pump, air vent, safety relive valve, and heat exchanger) are housed within the unit, for an aesthetically pleasing appearance.

Which would your customer prefer?



Traditional boiler installation
Labor-intensive science project

vs.

NextGen Boiler installation
Professional comfort system

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