Heat Loss Summary

ASHRAE Load Calculation

Project #:LFM/RICHEY LIVE WORK RIGHT

August 18, 2022

Project Information

Project #: LFM/RICHEY LIVE WORK RIGHT

Name: LFM/RICHEY LIVE WORK RIGHT

Location: 1716 COPPER RIDGE SPUR

Notes:

Load Calculation Summary

Design Location:	(User Specified) steamboat springs , Colorado	Component Losses:	23,753 Btu/hr
Load Calculation Method:	ASHRAE	Infiltration/Ventilation:	22,494 Btu/hr
Outdoor Temperature:	-15.0 °F	Radiant Back Losses:	3,755 Btu/hr
Floorplans / Levels:		Total Heating Load:	50,002 Btu/hr
Main Floor	1,234 ft²		
Second Floor	1,275 ft²	Radiant Heating:	46,246 Btu/hr
Total Area:	2,509 ft²	Radiant Back Losses:	3,755 Btu/hr
		Other:	0 Btu/hr
		Total Heating Load:	50,002 Btu/hr
		Surface Temperature:	78 - 87 °F

Load Calculation Results

Total Project

Room	Area	Heating Type	Room Temp	Walls	Windows	Doors	Skylights	Floor	Ceiling	Infiltration	Additional	Recovered Panel Loss	Design Load	Unit Loss
Total For Project	2,509	RH	70.0	8,657	6,929	5,893	0	5,444	2,258	22,494	0	-1,674	50,002	20.9

Main Floor

Suspended Construction

Room	Area	Heating Type	Room Temp	Walls	Windows	Doors	Skylights	Floor	Ceiling	Infiltration	Additional	Recovered Panel Loss	Design Load	Unit Loss
GARAGE	707	RH	70.0	2,154	309	5,893	0	1,613	0	6,217	0	0	16,187	23.9
OFFICE/BATH	185	RH	70.0	1,029	0	0	0	686	0	1,777	0	0	3,491	20.4
WORK SPACE	342	RH	70.0	1,311	309	0	0	1,269	0	3,281	0	0	6,171	19.1
Sub Total	1,234	RH	70.0	4,495	618	5,893	0	3,568	0	11,275	0	0	25,849	22.1

Length = ft Area = ft² Temperature = °F Flowrate = USGPM Air Flow = cfm 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:22.0.0594 R

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Second Floor

Suspended Construction

Room	Area	Heating Type	Room Temp	Walls	Windows	Doors	Skylights	Floor	Ceiling	Infiltration	Additional	Recovered Panel Loss	Design Load	Unit Loss
BEDS&BATH	400	RH	70.0	1,657	1,983	0	0	571	709	3,521	0	-571	7,870	20.9
GREAT ROOM	875	RH	70.0	2,505	4,327	0	0	1,305	1,550	7,698	0	-1,102	16,283	19.4
Sub Total	1,275	RH	70.0	4,162	6,311	0	0	1,876	2,258	11,219	0	-1,674	24,153	19.8

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Heat Loss Detail

ASHRAE Load Calculation

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August 18, 2022

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Design Location:	(User Specified) steamboat springs , Colorado	Component Losses:	23,753 Btu/hr
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Outdoor Temperature:	-15.0 °F	Radiant Back Losses:	3,755 Btu/hr
Floorplans / Levels:		Total Heating Load:	50,002 Btu/hr
Main Floor	1,234 ft²		
Second Floor	1,275 ft²	Radiant Heating:	46,246 Btu/hr
Total Area:	2,509 ft²	Radiant Back Losses:	3,755 Btu/hr
		Other:	0 Btu/hr
		Total Heating Load:	50,002 Btu/hr
		Surface Temperature:	78 - 87 °F

Load Calculation Data

Project Summary

Room	Area	Heating Type	Room Temp	Walls	Windows	Doors	Skylights	Floor	Ceiling	Infiltration	Additional	Recovered Panel Loss	Design Load	Unit Loss
Main Floor	1,234	RH	70.0	4,495	618	5,893	0	3,568	0	11,275	0	0	25,849	22.1
Second Floor	1,275	RH	70.0	4,162	6,311	0	0	1,876	2,258	11,219	0	-1,674	24,153	19.8
Total For Project	2,509	RH	70.0	8,657	6,929	5,893	0	5,444	2,258	22,494	0	-1,674	50,002	20.9

Main Floor

GARAGE

Total Area:	707 ft²	Infiltration/Ventilation Load:	6,217 Btu/hr
Ceiling Height:	12' ft	Component Losses:	9,970 Btu/hr
Volume:	7,773 ft³	Additional Losses:	0 Btu/hr
Exposed Perimeter:	77'-6" ft	Total Room Loss:	16,187 Btu/hr
		Recovered Floor Loss:	0 Btu/hr
Room Temperature:	70 °F	Net Room Load:	16,187 Btu/hr
Space Above:	Second Floor		

Heating System

Heating Type:	Radiant	Surface Temp:	81 °F
Floor Area:	676 ft²	Net Room Load:	16,187 Btu/hr
Unheated Area:	0 ft²	Floor Back Loss:	1,613 Btu/hr
Net Heated Area:	676 ft²	Recovered Floor Loss:	0 Btu/hr
Floor Cover Rv:	0.0 hr·ft²·°F/btu	Gross Upward Load:	14,573 Btu/hr
Panel Type:	Embedded Slab		
		Supplemental Heat Supply:	0 Btu/hr
Supplemental Heating Type:	Other	Net Upward Load:	14,573 Btu/hr
Required Supply Temp:	91 °F	Total Radiant Load:	16,187 Btu/hr

Component Losses

Component	Length	Width/Height	Area	Construction	Rv	Heat Loss	Unit Loss
Door	3'	8'	24	C2	3.0	680	1.0
Door	16'	10'	160	C2	3.0	4,533	6.7
Window	6'	2'	12	C3	3.3	309	0.5
Door	3'	8'	24	C2	3.0	680	1.0
Exposed Walls Above Grade	77'-6"	12'	710	C1	28.0	2,154	3.2
Slab	-	-	707	C4	Slab Insulation: 7.9 hr·ft²·°F/btu	1,613	2.4
Exposed Ceiling	-	-	0	-	48.0	0	0.0
Total	-	-	-	-	-	9,970	14.7

OFFICE/BATH

Total Area:	185 ft²	Infiltration/Ventilation Load:	1,777 Btu/hr
Ceiling Height:	12' ft	Component Losses:	1,715 Btu/hr
Volume:	2,222 ft³	Additional Losses:	0 Btu/hr
Exposed Perimeter:	28'-3" ft	Total Room Loss:	3,491 Btu/hr
		Recovered Floor Loss:	0 Btu/hr
Room Temperature:	70 °F	Net Room Load:	3,491 Btu/hr
Space Above:	Second Floor		
Space Below:	Open or Vented Crawlspace		

Heating System

Heating Type:	Radiant	Surface Temp:	78 °F
Floor Area:	171 ft²	Net Room Load:	3,491 Btu/hr
Unheated Area:	0 ft²	Floor Back Loss:	686 Btu/hr
Net Heated Area:	171 ft²	Recovered Floor Loss:	0 Btu/hr
Floor Cover Rv:	0.5 hr·ft²·°F/btu	Gross Upward Load:	2,806 Btu/hr
Panel Type:	Joist Trak Plates Below Sub-floor	Supplemental Heat Supply:	0 Btu/hr
		Net Upward Load:	2,806 Btu/hr
Supplemental Heating Type:	Other	Total Radiant Load:	3,491 Btu/hr
Required Supply Temp:	104 °F		

Component Losses

Component	Length	Width/Height	Area	Construction	Rv	Heat Loss	Unit Loss
Exposed Walls Above Grade	28'-3"	12'	339	C1	28.0	1,029	6.0
Floor	-	-	185	C6	38.0 (panel Insulation)	686	4.0
Exposed Ceiling	-	-	0	-	48.0	0	0.0
Total	-	-	-	-	-	1,715	10.0

WORK SPACE

Total Area:	342 ft²	Infiltration/Ventilation Load:	3,281 Btu/hr
Ceiling Height:	12' ft	Component Losses:	2,889 Btu/hr
Volume:	4,103 ft³	Additional Losses:	0 Btu/hr
Exposed Perimeter:	37' ft	Total Room Loss:	6,171 Btu/hr
		Recovered Floor Loss:	0 Btu/hr
Room Temperature:	70 °F	Net Room Load:	6,171 Btu/hr
Space Above:	Second Floor		
Space Below:	Open or Vented Crawlspace		

Heating System

Heating Type:	Radiant	Surface Temp:	78 °F
Floor Area:	324 ft²	Net Room Load:	6,171 Btu/hr
Unheated Area:	0 ft²	Floor Back Loss:	1,269 Btu/hr
Net Heated Area:	324 ft²	Recovered Floor Loss:	0 Btu/hr
Floor Cover Rv:	0.5 hr·ft²·°F/btu	Gross Upward Load:	4,902 Btu/hr
Panel Type:	Joist Trak Plates Below Sub-floor	Supplemental Heat Supply:	0 Btu/hr
		Net Upward Load:	4,902 Btu/hr
Supplemental Heating Type:	Other	Total Radiant Load:	6,171 Btu/hr
Required Supply Temp:	101 °F		

Component Losses

Component	Length	Width/Height	Area	Construction	Rv	Heat Loss	Unit Loss
Window	6'	2'	12	C3	3.3	309	1.0
Exposed Walls Above Grade	37'	12'	432	C1	28.0	1,311	4.1
Floor	-	-	342	C6	38.0 (panel Insulation)	1,269	3.9
Exposed Ceiling	-	-	0	-	48.0	0	0.0
Total	-	-	-	-	-	2,889	8.9

Second Floor

BEDS&BATH

Total Area:	400 ft²	Infiltration/Ventilation Load:	3,521 Btu/hr
Ceiling Height:	11' ft	Component Losses:	4,921 Btu/hr
Volume:	4,403 ft³	Additional Losses:	0 Btu/hr
Exposed Perimeter:	56'-8" ft	Total Room Loss:	8,442 Btu/hr
		Recovered Floor Loss:	-571 Btu/hr
Room Temperature:	70 °F	Net Room Load:	7,870 Btu/hr
Space Above:	Not Heated		

Heating System

Heating Type:	Radiant	Surface Temp:	80 °F
Floor Area:	377 ft²	Net Room Load:	7,870 Btu/hr
Unheated Area:	0 ft²	Floor Back Loss:	571 Btu/hr
Net Heated Area:	377 ft²	Recovered Floor Loss:	-571 Btu/hr
Floor Cover Rv:	0.7 hr·ft²·°F/btu	Gross Upward Load:	7,870 Btu/hr
Panel Type:	Joist Trak Plates Below Sub-floor	Supplemental Heat Supply:	0 Btu/hr
		Net Upward Load:	7,870 Btu/hr
Supplemental Heating Type:	Other	Total Radiant Load:	8,442 Btu/hr
Required Supply Temp:	117 °F		

Component Losses

Component	Length	Width/Height	Area	Construction	Rv	Heat Loss	Unit Loss
Window	2'-6"	5'	13	C3	3.3	322	0.9
Window	2'-6"	5'	13	C3	3.3	322	0.9
Window	2'-6"	2'	5	C3	3.3	129	0.3
Window	2'-6"	2'	5	C3	3.3	129	0.3
Window	3'	2'	6	C3	3.3	155	0.4
Window	3'	6'	18	C3	3.3	464	1.2
Window	3'	6'	18	C3	3.3	464	1.2
Exposed Walls Above Grade	56'-8"	11'	546	C1	28.0	1,657	4.4
Floor	-	-	400	C6	38.0 (panel Insulation)	571	1.5
Exposed Ceiling	-	-	400	C5	48.0	709	1.9
Total	-	-	-	-	-	4,921	13.1

GREAT ROOM

Total Area:	875 ft²	Infiltration/Ventilation Load:	7,698 Btu/hr
Ceiling Height:	11' ft	Component Losses:	9,687 Btu/hr
Volume:	9,625 ft³	Additional Losses:	0 Btu/hr
Exposed Perimeter:	90'-4" ft	Total Room Loss:	17,385 Btu/hr
Room Temperature:	70 °F	Recovered Floor Loss:	-1,102 Btu/hr
Space Above:	Not Heated	Net Room Load:	16,283 Btu/hr
Space Below:	Main Floor/Open or Vented Crawlspace		

Heating System

Heating Type:	Radiant	Surface Temp:	81 °F
Floor Area:	840 ft²	Net Room Load:	16,283 Btu/hr
Unheated Area:	109 ft²	Floor Back Loss:	1,305 Btu/hr
Net Heated Area:	732 ft²	Recovered Floor Loss:	-1,102 Btu/hr
Floor Cover Rv:	0.7 hr·ft²·°F/btu	Gross Upward Load:	16,095 Btu/hr
Panel Type:	Joist Trak Plates Below Sub-floor	Supplemental Heat Supply:	0 Btu/hr
		Net Upward Load:	16,095 Btu/hr
Supplemental Heating Type:	Other	Total Radiant Load:	17,385 Btu/hr
Required Supply Temp:	119 °F		

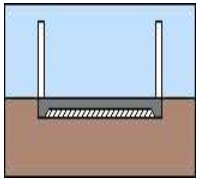
Component Losses

Component	Length	Width/Height	Area	Construction	Rv	Heat Loss	Unit Loss
Window	4'	6'	24	C3	3.3	618	0.7
Window	4'	2'	8	C3	3.3	206	0.2
Window	3'	6'	18	C3	3.3	464	0.6
Window	3'	6'	18	C3	3.3	464	0.6
Window	3'	6'	18	C3	3.3	464	0.6
Window	3'	6'	18	C3	3.3	464	0.6
Window	4'	6'	24	C3	3.3	618	0.7
Window	4'	6'	24	C3	3.3	618	0.7
Window	8'	2'	16	C3	3.3	412	0.5
Exposed Walls Above Grade	90'-4"	11'	825	C1	28.0	2,505	3.0
Floor	-	-	875	C6	38.0 (panel Insulation)	1,305	1.6
Exposed Ceiling	-	-	875	C5	48.0	1,550	1.8
Total	-	-	-	-	-	9,687	11.5

Construction Legend

Construction Code	Component	R-Value	Source	Description
C1	Wall	28.0	User Specified	CUSTOM
C2	Door	3.0	User Specified	CUSTOM
C3	Window	3.3	User Specified	Operable windows - Double Glazing (e = 0.05 on surface 2 or 3), 6 mm air space, Aluminum With Thermal Break
C4	Slab	Slab Insulation: 7.9 hr·ft²·°F/btu	CSA 2012	SCB_25 - concrete or soil (for crawl space) floor - bottom of slab fully insulated except under footing/foundation wall (ie. insulation starts 0.25 m from edge) - first storey is non-brick veneer or bricks thermally broken from concrete floor
C5	Ceiling	48.0	User Specified	CUSTOM
C6	Heated Floor	38.0 (panel Insulation)	User Specified	Joist Trak Plates Below Sub-floor

CSA Construction Legend



C4

Description

SCB_25
- concrete or soil (for crawl space) floor
- bottom of slab fully insulated except under footing/foundation wall (ie. insulation starts 0.25 m from edge)
- first storey is non-brick veneer or bricks thermally broken from concrete floor

Options

Slab Insulation: 7.9 hr·ft²·°F/btu

Design Locaton

Location:	steamboat springs	Altitude:	7000' ft
Province/State:	Colorado	Standard Pressure:	11.7 Psi
Country:	United States		
Outdoor Heating Design Temp:	-15.0 °F	Humidity Ratio:	0.0004
Heating Degree Days:	4731	Mean Soil Temp:	47.2 °F
Average Air Temperatures:			
January:	0.0 °F	July:	67.1 °F
February:	10.0 °F	August:	65.1 °F
March:	33.3 °F	September:	56.1 °F
April:	42.1 °F	October:	43.9 °F
May:	51.3 °F	November:	30.2 °F
June:	59.7 °F	December:	18.0 °F

ASHRAECustom

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August 18, 2022

Project Information

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Name: LFM/RICHEY LIVE WORK RIGHT
Location: 1716 COPPER RIDGE SPUR

Notes:

Project Summary

Load Calculation Method:	ASHRAE	Total Circuit Lengths:		Component Losses:	23,753	Btu/hr
Design Location:	(User Specified) steamboat springs , Colorado	hePEX 1/2"	4,130 ft	Infiltration/Ventilation:	22,494	Btu/hr
Outdoor Temperature:	-15.0 °F	Total RH Circuits:	22	Radiant Back Losses:	3,755	Btu/hr
Floorplans / Levels:		Total Manifolds:	5	Total Heating Load:	50,002	Btu/hr
Main Floor	1,234 ft²	Total Zones:	4	Radiant Heating:	46,246	Btu/hr
Second Floor	1,275 ft²			Radiant Back Losses:	3,755	Btu/hr
Total Area:	2,509 ft²	Fluid Type:	100% Water	Other:	0	Btu/hr
		Total Tubing Volume:	38.02 USG	Total Heating Load:	50,002	Btu/hr
		Surface Temperature:	78 - 87 °F			

Zone Heating Summary

Zone #	Gross Area	Construction	Heating Types	RH[1] Circuits	Total Tubing	Manifolds	Flowrate	Head Loss (Circuit Only)	RH Load[2]	Supplemental	Zone Load[3]
Zone 101	1,049	multiple	RH	9	1,709	2	2.25	0.9	22,357	0	22,357
Zone 102	185	Joist Trak Plates Below Sub-floor	RH	2	272	1	0.35	0.4	3,491	0	3,491
Zone 201	875	Joist Trak Plates Below Sub-floor	RH	8	1,513	1	1.74	1.1	17,385	0	17,385
Zone 202	400	Joist Trak Plates Below Sub-floor	RH	3	636	1	0.85	1.0	8,442	0	8,442

(1) Complete circuits assigned to this zone. (2) Total Radiant heating load for rooms in zone, including all panel back loss. (3) Total load for zone including all panel back loss. Does not account for reclaimed loss within building envelope.

Room Heating Summary (By Construction Type)

Embedded Slab

Zone #	Room Name	Heating Type	Floor Area	Heated Area	Manifold #	Tube Size	RH Circuits[1]	Tube Spacing	Tubing In Room	Floor Cover RV	Required Temp.	Unit RH Load	RH Load[2]	Supplemental	Total Load[3]
Zone 101	GARAGE	RH	676	676	GARAGE	1/2"	6	7	1,150	0.0	91	23.9	16,187	0	16,187

(1) Circuits assigned to this room. Leaders from other rooms may not be counted. (2) Includes panel back loss. (3) Total load including panel back loss. Does not account for reclaimed loss within building envelope.

Joist Trak Plates Below Sub-floor

Zone #	Room Name	Heating Type	Floor Area	Heated Area	Manifold #	Tube Size	RH Circuits[1]	Tube Spacing	Tubing In Room	Floor Cover RV	Required Temp.	Unit RH Load	RH Load[2]	Supplemental	Total Load[3]
Zone 101	WORK SPACE	RH	324	324	WORK SPACE	1/2"	3	8	492	0.5	101	19.1	6,171	0	6,171
Zone 102	OFFICE/BATH	RH	171	171	OFFICE/BATH	1/2"	2	8	259	0.5	104	20.4	3,491	0	3,491
Zone 201	GREAT ROOM	RH	840	732	GREAT ROOM	1/2"	8	7	1,465	0.7	119	23.8	17,385	0	17,385
Zone 202	BEDS&BATH	RH	377	377	BEDS&BATH	1/2"	3	8	618	0.7	117	22.4	8,442	0	8,442

(1) Circuits assigned to this room. Leaders from other rooms may not be counted. (2) Includes panel back loss. (3) Total load including panel back loss. Does not account for reclaimed loss within building envelope.

Manifold Summary

Manifold Name	# Zones	# Circuits	Flow	Head Loss[1]	Required Temp.	Supplied Temp.	Temp Drop	Manifold Type	Control Type	# Actuators	S/R Length[2]	S/R Pipe
BEDS&BATH	1	3	0.85	1.0	117	119	20	TruFLOW Jr Valved w/ Balancing	Manifold	0	-	-
GARAGE	1	6	1.63	1.0	91	104	20	TruFLOW Jr Valved w/ Balancing	Manifold	0	-	-
GREAT ROOM	1	8	1.74	1.2	119	119	20	TruFLOW Jr Valved w/ Balancing	Manifold	0	-	-
OFFICE/BATH	1	2	0.35	0.4	104	104	20	TruFLOW Jr Valved w/ Balancing	Manifold	0	-	-
WORK SPACE	1	3	0.62	0.6	101	104	20	TruFLOW Jr Valved w/ Balancing	Manifold	0	-	-
Total	4	22	5.19	1.2	-	-	-	-	-	0	-	-

(1) Total Head loss includes manifold, circuits and supply/return piping if specified. (2) S/R Length = one way

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Heating System Detail

Project #:LFM/RICHEY LIVE WORK RIGHT
August 18, 2022

Project Information

Project #: LFM/RICHEY LIVE WORK RIGHT
Name: LFM/RICHEY LIVE WORK RIGHT
Location: 1716 COPPER RIDGE SPUR

Notes:

Design Conditions and Summary

Load Calculation Method:	ASHRAE
Design Location:	(User Specified) steamboat springs , Colorado
Outdoor Temperature:	-15.0 °F
Floorplans / Levels:	
Main Floor	1,234 ft²
Second Floor	1,275 ft²
Total Area:	2,509 ft²

Total Tubing Lengths:	
hePEX 1/2"	4,130 ft
Total RH Circuits:	22
Total Manifolds:	5
Total Zones:	4
Fluid Type:	100% Water
Total Tubing Volume:	38.02 USG

Component Losses:	23,753 Btu/hr
Infiltration/Ventilation:	22,494 Btu/hr
Radiant Back Losses:	3,755 Btu/hr
Total Heating Load:	50,002 Btu/hr
Radiant Heating:	46,246 Btu/hr
Radiant Back Losses:	3,755 Btu/hr
Other:	0 Btu/hr
Total Heating Load:	50,002 Btu/hr

Zone Heating Summary

Zone #	Area	Heating Types	RH Circuits	Flowrate	Head Loss	Supplemental	Rooms
101	1,049	RH	9	2.25	1.0	0	GARAGE, WORK SPACE
102	185	RH	2	0.35	0.4	0	OFFICE/BATH
201	875	RH	8	1.74	1.2	0	GREAT ROOM
202	400	RH	3	0.85	1.0	0	BEDS&BATH
Total	2,509	RH	22	5.19	1.2	0	

*RH Loads include internal panel back loss that may not be included in the project total.

Room Heating Summary

Main Floor

GARAGE

Total Area:	707	ft²	Radiant Heating:			Load/Loss Summary:	
Heated by:	RH		Heated Area:	676	ft²	**Room Design Load:**	14,573 Btu/hr
Room Temperature:	70	°F	Tubing in Floor:	1,164	ft		
Floor Covering (Rv):	0.0 - CUSTOM		Circuits in Room:	6		Radiant Load:	16,187 Btu/hr
			Tube Spacing:	7		Baseboard Load:	0 Btu/hr
			Required Surface Temp:	81	°F	Forced Air Load	0 Btu/hr
			Required Water Temp:	91	°F	Other Load:	0 Btu/hr
			Est. Peak Output:	22,625	Btu/hr		
						Radiant Back Loss:	1,613 Btu/hr
						Recovered Back Loss:	0 Btu/hr
						Total Heat Loss:	16,187 Btu/hr

OFFICE/BATH

Total Area:	185	ft²	Radiant Heating:			Load/Loss Summary:	
Heated by:	RH		Heated Area:	171	ft²	**Room Design Load:**	2,806 Btu/hr
Room Temperature:	70	°F	Tubing in Floor:	264	ft		
Floor Covering (Rv):	0.5		Circuits in Room:	2		Radiant Load:	3,491 Btu/hr
			Tube Spacing:	8		Baseboard Load:	0 Btu/hr
			Required Surface Temp:	78	°F	Forced Air Load	0 Btu/hr
			Required Water Temp:	104	°F	Other Load:	0 Btu/hr
			Est. Peak Output:	2,809	Btu/hr		
						Radiant Back Loss:	686 Btu/hr
						Recovered Back Loss:	0 Btu/hr
						Total Heat Loss:	3,491 Btu/hr

WORK SPACE

Total Area:	342 ft²	Radiant Heating:		Load/Loss Summary:	
Heated by:	RH	Heated Area:	324 ft²	**Room Design Load:**	4,902 Btu/hr
Room Temperature:	70 °F	Tubing in Floor:	503 ft		
Floor Covering (Rv):	0.5	Circuits in Room:	3	Radiant Load:	6,171 Btu/hr
		Tube Spacing:	8	Baseboard Load:	0 Btu/hr
		Required Surface Temp:	78 °F	Forced Air Load	0 Btu/hr
		Required Water Temp:	101 °F	Other Load:	0 Btu/hr
		Est. Peak Output:	5,223 Btu/hr		
				Radiant Back Loss:	1,269 Btu/hr
				Recovered Back Loss:	0 Btu/hr
				Total Heat Loss:	6,171 Btu/hr

Second Floor

BEDS&BATH

Total Area:	400 ft²	Radiant Heating:		Load/Loss Summary:	
Heated by:	RH	Heated Area:	377 ft²	**Room Design Load:**	7,870 Btu/hr
Room Temperature:	70 °F	Tubing in Floor:	635 ft		
Floor Covering (Rv):	0.7 - 1/2 in.oak parquet and pad	Circuits in Room:	3	Radiant Load:	8,442 Btu/hr
		Tube Spacing:	8	Baseboard Load:	0 Btu/hr
		Required Surface Temp:	80 °F	Forced Air Load	0 Btu/hr
		Required Water Temp:	117 °F	Other Load:	0 Btu/hr
		Est. Peak Output:	8,217 Btu/hr		
				Radiant Back Loss:	571 Btu/hr
				Recovered Back Loss:	-571 Btu/hr
				Total Heat Loss:	7,870 Btu/hr

GREAT ROOM

Total Area:	875 ft²	Radiant Heating:		Load/Loss Summary:	
Heated by:	RH	Heated Area:	732 ft²	**Room Design Load:**	16,095 Btu/hr
Room Temperature:	70 °F	Tubing in Floor:	1,505 ft		
Floor Covering (Rv):	0.7 - 1/2 in.oak parquet and pad	Circuits in Room:	8	Radiant Load:	17,385 Btu/hr
		Tube Spacing:	7	Baseboard Load:	0 Btu/hr
		Required Surface Temp:	81 °F	Forced Air Load	0 Btu/hr
		Required Water Temp:	119 °F	Other Load:	0 Btu/hr
		Est. Peak Output:	16,095 Btu/hr		
				Radiant Back Loss:	1,290 Btu/hr
		Supplemental Req'd:	0 Btu/hr	Recovered Back Loss:	-1,102 Btu/hr
				Total Heat Loss:	16,283 Btu/hr

Radiant Heating Details

Manifold Summary

Manifold Name	Zones	Circuits	Flowrate	Head Loss[1]	Required Temp.	Supplied Temp.	Temp Drop	Manifold Type	Control Type	Actuators	S/R Length[2]	S/R Pipe
BEDS&BATH	1	3	0.85	1.0	117	119	20	TruFLOW Jr Valved w/ Balancing	Manifold	0	-	-
GARAGE	1	6	1.63	1.0	91	104	20	TruFLOW Jr Valved w/ Balancing	Manifold	0	-	-
GREAT ROOM	1	8	1.74	1.2	119	119	20	TruFLOW Jr Valved w/ Balancing	Manifold	0	-	-
OFFICE/BATH	1	2	0.35	0.4	104	104	20	TruFLOW Jr Valved w/ Balancing	Manifold	0	-	-
WORK SPACE	1	3	0.62	0.6	101	104	20	TruFLOW Jr Valved w/ Balancing	Manifold	0	-	-
Total	4	22	5.19	1.2	119	-	-	-	-	0	-	-

(1) Total Head loss includes manifold, circuits and supply/return piping if specified., (2) S/R Length = one way

Tubing Circuit Details

BEDS&BATH

Circuit	Rooms Served	Total Length	Tube Spacing	Area Covered	Tubing	Flowrate	Head Loss[1]	Temp Drop	Load	Actuator	Valve Setting
B-5	BEDS&BATH	215	8	124	hePEX 1/2"	0.28	0.9	20	2,771	No	2.65
B-11	BEDS&BATH	216	8	129	hePEX 1/2"	0.29	1.0	20	2,899	No	4.2
B-12	BEDS&BATH	205	8	124	hePEX 1/2"	0.28	0.9	20	2,771	No	1.81
Total	-	636		377	-	0.85	1.0		8,442	0	

(1) Head loss for circuit tubing only

GARAGE

Circuit	Rooms Served	Total Length	Tube Spacing	Area Covered	Tubing	Flowrate	Head Loss[1]	Temp Drop	Load	Actuator	Valve Setting
A-6	GARAGE	205	7	107	hePEX 1/2"	0.26	0.8	20	2,567	No	1.96
A-7	GARAGE	197	7	119	hePEX 1/2"	0.29	0.9	20	2,856	No	4.2
A-8	GARAGE	198	7	110	hePEX 1/2"	0.26	0.8	20	2,631	No	1.77
A-9	GARAGE	198	7	110	hePEX 1/2"	0.26	0.8	20	2,631	No	1.77
A-10	GARAGE	202	7	114	hePEX 1/2"	0.27	0.9	20	2,729	No	4.05
A-11	GARAGE	197	7	116	hePEX 1/2"	0.28	0.9	20	2,771	No	4.2
Total	-	1,197		676	-	1.63	0.9		16,187	0	

(1) Head loss for circuit tubing only

GREAT ROOM

Circuit	Rooms Served	Total Length	Tube Spacing	Area Covered	Tubing	Flowrate	Head Loss[1]	Temp Drop	Load	Actuator	Valve Setting
B-1	GREAT ROOM	150	7	91	hePEX 1/2"	0.22	0.4	20	2,156	No	0.8
B-2	GREAT ROOM	143	7	87	hePEX 1/2"	0.21	0.4	20	2,072	No	0.76
B-3	GREAT ROOM	138	7	83	hePEX 1/2"	0.20	0.3	20	1,975	No	0.73
B-4	GREAT ROOM	226	7	80	hePEX 1/2"	0.19	0.5	20	1,904	No	0.78
B-6	GREAT ROOM	255	7	116	hePEX 1/2"	0.28	1.1	20	2,757	No	4.2
B-7	GREAT ROOM	206	7	76	hePEX 1/2"	0.18	0.4	20	1,794	No	0.72
B-8	GREAT ROOM	245	7	114	hePEX 1/2"	0.27	1.0	20	2,710	No	2.66
B-9	GREAT ROOM	150	7	85	hePEX 1/2"	0.20	0.4	20	2,017	No	0.74
Total	-	1,513		732	-	1.74	1.1		17,385	0	

(1) Head loss for circuit tubing only

OFFICE/BATH

Circuit	Rooms Served	Total Length	Tube Spacing	Area Covered	Tubing	Flowrate	Head Loss[1]	Temp Drop	Load	Actuator	Valve Setting
A-1	OFFICE/BATH	153	8	96	hePEX 1/2"	0.20	0.4	20	1,966	No	4.2
A-2	OFFICE/BATH	118	8	75	hePEX 1/2"	0.15	0.2	20	1,525	No	0.95
Total	-	272		171	-	0.35	0.4		3,491	0	

(1) Head loss for circuit tubing only

WORK SPACE

Circuit	Rooms Served	Total Length	Tube Spacing	Area Covered	Tubing	Flowrate	Head Loss[1]	Temp Drop	Load	Actuator	Valve Setting
A-3	WORK SPACE	161	8	103	hePEX 1/2"	0.20	0.4	20	1,970	No	1.08
A-4	WORK SPACE	190	8	117	hePEX 1/2"	0.22	0.6	20	2,234	No	4.2
A-5	WORK SPACE	161	8	103	hePEX 1/2"	0.20	0.4	20	1,967	No	1.07
Total	-	512		324	-	0.62	0.6		6,171	0	

(1) Head loss for circuit tubing only

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Water Supply Summary

Project #:LFM/RICHEY LIVE WORK RIGHT
August 18, 2022

Project Information

Project #: LFM/RICHEY LIVE WORK RIGHT
Name: LFM/RICHEY LIVE WORK RIGHT
Location: 1716 COPPER RIDGE SPUR

Notes:

Supply Summary

Name	Temp	Total Fluid Vol	Total Flow	Head Loss[1]	Load[2]	# Circuits	# Zones
Water Temperature	104	18.23	2.60	1.0	25,849	11	2
Water Temperature	119	19.79	2.59	1.2	25,827	11	2

(1) Head loss includes manifolds, circuits, and supply/return piping if specified, may also contain control valve losses. (2) Load includes all panel back losses.

Manifold Summary

Manifold Name	Circuits	Flowrate	Required Temp.	Supplied Temp.	Manifold Type	S/R Length[1]	S/R Pipe	Manifold Head Loss	Circuit Head Loss	S/R Head Loss	Total Head Loss[2]
BEDS&BATH	3	0.85	117	119	TruFLOW Jr Valved w/ Balancing	-	-	0.1	1.0	0.0	1.0
GARAGE	6	1.63	91	104	TruFLOW Jr Valved w/ Balancing	-	-	0.1	0.9	0.0	1.0
GREAT ROOM	8	1.74	119	119	TruFLOW Jr Valved w/ Balancing	-	-	0.1	1.1	0.0	1.2
OFFICE/BATH	2	0.35	104	104	TruFLOW Jr Valved w/ Balancing	-	-	0.0	0.4	0.0	0.4
WORK SPACE	3	0.62	101	104	TruFLOW Jr Valved w/ Balancing	-	-	0.0	0.6	0.0	0.6
Total	22	5.19	-	-	-	-	-	0.1	1.1	0.0	1.2

(1) S/R Length = one way, (2) Total Head loss includes manifold, circuits and supply/return piping if specified.

Water Temperature (104 °F)

GARAGE (104 °F, TruFLOW Jr Valved w/ Balancing, 6 Circuits)

Circuit	Rooms Served	Total Length	Tube Spacing	Area Covered	Tubing	Flowrate	Head Loss[1]	Temp Drop[2]	Load[3]	Actuator	Valve Setting
A-6	GARAGE	205	7	107	hePEX 1/2"	0.26	0.8	20	2,567	No	1.96
A-7	GARAGE	197	7	119	hePEX 1/2"	0.29	0.9	20	2,856	No	4.2
A-8	GARAGE	198	7	110	hePEX 1/2"	0.26	0.8	20	2,631	No	1.77
A-9	GARAGE	198	7	110	hePEX 1/2"	0.26	0.8	20	2,631	No	1.77
A-10	GARAGE	202	7	114	hePEX 1/2"	0.27	0.9	20	2,729	No	4.05
A-11	GARAGE	197	7	116	hePEX 1/2"	0.28	0.9	20	2,771	No	4.2
Total	-	1,197		676	-	1.63	0.9	-	16,187	0	

(1) Head loss for circuit tubing only. (2) Design Temp Drop (Estimated Actual Drop). (3) Required load. Includes panel back losses. Does not reflect maximum capacity of the circuit.

OFFICE/BATH (104 °F, TruFLOW Jr Valved w/ Balancing, 2 Circuits)

Circuit	Rooms Served	Total Length	Tube Spacing	Area Covered	Tubing	Flowrate	Head Loss[1]	Temp Drop[2]	Load[3]	Actuator	Valve Setting
A-1	OFFICE/BATH	153	8	96	hePEX 1/2"	0.20	0.4	20	1,966	No	4.2
A-2	OFFICE/BATH	118	8	75	hePEX 1/2"	0.15	0.2	20	1,525	No	0.95
Total	-	272		171	-	0.35	0.4	-	3,491	0	

(1) Head loss for circuit tubing only. (2) Design Temp Drop (Estimated Actual Drop). (3) Required load. Includes panel back losses. Does not reflect maximum capacity of the circuit.

WORK SPACE (104 °F, TruFLOW Jr Valved w/ Balancing, 3 Circuits)

Circuit	Rooms Served	Total Length	Tube Spacing	Area Covered	Tubing	Flowrate	Head Loss[1]	Temp Drop[2]	Load[3]	Actuator	Valve Setting
A-3	WORK SPACE	161	8	103	hePEX 1/2"	0.20	0.4	20	1,970	No	1.08
A-4	WORK SPACE	190	8	117	hePEX 1/2"	0.22	0.6	20	2,234	No	4.2
A-5	WORK SPACE	161	8	103	hePEX 1/2"	0.20	0.4	20	1,967	No	1.07
Total	-	512		324	-	0.62	0.6	-	6,171	0	

(1) Head loss for circuit tubing only. (2) Design Temp Drop (Estimated Actual Drop). (3) Required load. Includes panel back losses. Does not reflect maximum capacity of the circuit.

Water Temperature (119 °F)

BEDS&BATH (119 °F, TruFLOW Jr Valved w/ Balancing, 3 Circuits)

Circuit	Rooms Served	Total Length	Tube Spacing	Area Covered	Tubing	Flowrate	Head Loss[1]	Temp Drop[2]	Load[3]	Actuator	Valve Setting
B-5	BEDS&BATH	215	8	124	hePEX 1/2"	0.28	0.9	20	2,771	No	2.65
B-11	BEDS&BATH	216	8	129	hePEX 1/2"	0.29	1.0	20	2,899	No	4.2
B-12	BEDS&BATH	205	8	124	hePEX 1/2"	0.28	0.9	20	2,771	No	1.81
Total	-	636		377	-	0.85	1.0	-	8,442	0	

(1) Head loss for circuit tubing only. (2) Design Temp Drop (Estimated Actual Drop). (3) Required load. Includes panel back losses. Does not reflect maximum capacity of the circuit.

GREAT ROOM (119 °F, TruFLOW Jr Valved w/ Balancing, 8 Circuits)

Circuit	Rooms Served	Total Length	Tube Spacing	Area Covered	Tubing	Flowrate	Head Loss[1]	Temp Drop[2]	Load[3]	Actuator	Valve Setting
B-1	GREAT ROOM	150	7	91	hePEX 1/2"	0.22	0.4	20	2,156	No	0.8
B-2	GREAT ROOM	143	7	87	hePEX 1/2"	0.21	0.4	20	2,072	No	0.76
B-3	GREAT ROOM	138	7	83	hePEX 1/2"	0.20	0.3	20	1,975	No	0.73
B-4	GREAT ROOM	226	7	80	hePEX 1/2"	0.19	0.5	20	1,904	No	0.78
B-6	GREAT ROOM	255	7	116	hePEX 1/2"	0.28	1.1	20	2,757	No	4.2
B-7	GREAT ROOM	206	7	76	hePEX 1/2"	0.18	0.4	20	1,794	No	0.72
B-8	GREAT ROOM	245	7	114	hePEX 1/2"	0.27	1.0	20	2,710	No	2.66
B-9	GREAT ROOM	150	7	85	hePEX 1/2"	0.20	0.4	20	2,017	No	0.74
Total	-	1,513		732	-	1.74	1.1	-	17,385	0	

(1) Head loss for circuit tubing only. (2) Design Temp Drop (Estimated Actual Drop). (3) Required load. Includes panel back losses. Does not reflect maximum capacity of the circuit.

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Radiant Panel Schedule

Project #:LFM/RICHEY LIVE WORK RIGHT
August 18, 2022

Project Information

Project #: LFM/RICHEY LIVE WORK RIGHT
Name: LFM/RICHEY LIVE WORK RIGHT
Location: 1716 COPPER RIDGE SPUR

Notes:

Design Conditions and Summary

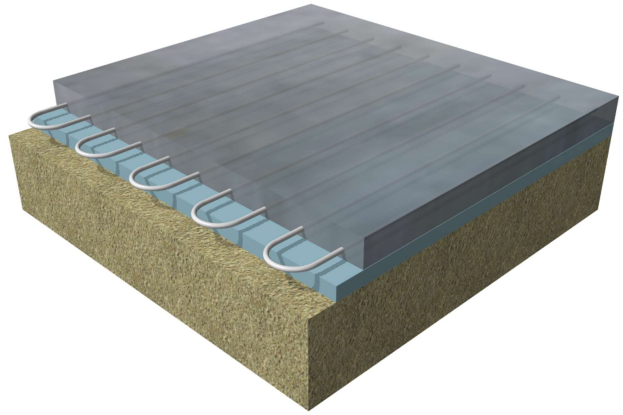
Load Calculation Method:	ASHRAE
Design Location:	(User Specified) steamboat springs , Colorado
Outdoor Temperature:	-15.0 °F
Floorplans / Levels:	
Main Floor	1,234 ft²
Second Floor	1,275 ft²
Total Area:	2,509 ft²

Component Losses:	23,753 Btu/hr
Infiltration/Ventilation:	22,494 Btu/hr
Radiant Back Losses:	3,755 Btu/hr
Total Heating Load:	50,002 Btu/hr
Radiant Heating:	46,246 Btu/hr
Radiant Back Losses:	3,755 Btu/hr
Other:	0 Btu/hr
Total Heating Load:	50,002 Btu/hr

Radiant Panel Details

Panel Type #1 - Embedded Slab

Slab Thickness:	4.0 in
Tube Depth:	2.5 in
Slab R per Inch (Embedding Material):	0.15 °F•ft²•hr/(Btu•in)
Spacing:	7 in
Fastener:	2 Foam Staples
Floorplans:	
Main Floor	676 ft²



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

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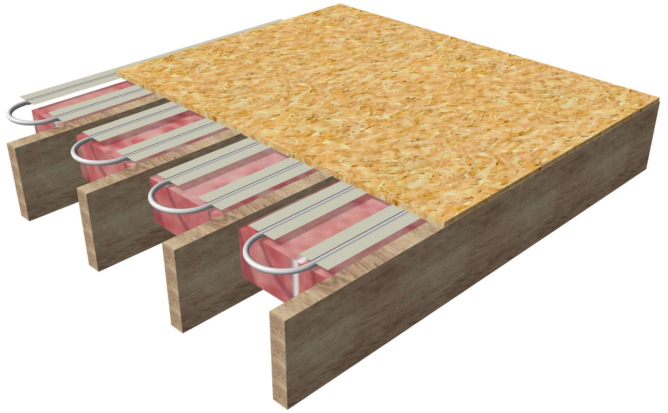
See end of report for important Notes and Disclaimers.

Panel Type #2 - Joist Trak Plates Below Sub-floor

Plate Description:	Joist Trak, extruded aluminum heat transfer plate.
Sub-Floor Thickness:	0.750 in
Sub-Floor Rv:	0.9 hr·ft²·°F/btu
Joist Construction:	Joist 2"x10" pine, 16" OC
Joist Spacing:	16 in
Joist Insulation Rv:	38.0 hr·ft²·°F/btu
Spacing:	8 in, 7 in
Floorplans:	
Main Floor	495 ft²
Second Floor	1,217 ft²



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The calculated values shown in this report are based on the data input by the user of the software. Inaccurate or erroneous data input will result in inaccurate or erroneous results. You are strongly advised to review all input data carefully, and to have the calculated results reviewed by an experienced heating professional to ensure reasonableness and suitability for your application.

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