

Simple Heating System Size: Climate Zone 1

Project Information

Whitney-Gedeon Residence
4219 91st Avenue SE, Mercer Island, WA 98040

Contact Information

Live-Work-Play, Sheri Newbold
sheri@live-work-play.net

Indoor Design Temperature 70
 Outdoor Design Temperature 25

Design Temperature Difference (ΔT)
 ΔT = Indoor - Outdoor Design Temp 45
 Conditioned Floor Area 2206
 Conditioned Volume #####

Glazing

Copy Sum of UA from Glazing Schedule 118

Attic	U-Factor	X	Area	=	UA
R-49	0.027				
R-38 Advanced	0.026				

Single Rafter or Joist Vaulted Ceilings	U-Factor	X	Area	=	UA
R-38 Vented	0.027				
R-49 VENTED	0.02		2206		44.1

Above Grade Walls	U-Factor	X	Area	=	UA
R-21	0.056		1688		94.5
R-21 + R-6					

Floors	U-Factor	X	Area	=	UA
R-30	0.029				
R-38	0.025		2206		55.2

Below Grade Walls	U-Factor	X	Area	=	UA
2' Depth Walls	0.042				
3.5' Depth Walls	0.041				
7' Depth Walls	0.037				

Slab Below Grade	F-Factor	X	Length	=	UA
2' Depth	0.59				
3.5' Depth	0.64				
7' Depth	0.57				

Slab on Grade	F-Factor	X	Length	=	UA
R-10 2' perimeter	0.54				
R-10 Full - Heated	0.55				

Sum of UA 312

Envelope Heat Load 14028 Btu / Hour
 Sum of UA X ΔT

Air Leakage Heat Load 9909 Btu / Hour
 ((Volume X 0.6) X ΔT) X .018))

Building Design Heat Load 23936 Btu / Hour
 Air Leakage + Envelope Heat Loss

Building and Duct Heat Load 23936 Btu / Hour
 If ducts are located in unconditioned space: Sum of Building Heat Loss X 1.1
 If ducts are located in conditioned space: Sum of Building Heat Loss X 1

Maximum Heat Equipment Output 33511 Btu / Hour
 Building and Duct Heat Loss X 1.40

UNTESTED GLAZED FENESTRATION U-FACTOR

FRAME TYPE	SINGLE PANE	DOUBLE PANE	SKYLIGHT
Metal	1.20	0.80	See Table R303.1.3(4)
Metal with Thermal Break	1.10	0.65	
Nonmetal or Metal Clad	0.95	0.55	
Glazed Block	0.60		

Building Envelope U-Values
 Refer to 2012 WSEC Appendix A for

Ceilings w/no insulation	U=0.30
Floors w/no insulation	U=0.134
Walls w/no insulation	U=0.31
Glass Blocks	U=0.51

	Heating Design Temp		Heating Design Temp
Aberdeen 20 NNE	25.0	Medical Lake	4.0
Anacortes	24.0	Medina	24.0
Anatone	-4.0	Mercer Island	25.0
Appleton	11.0	Metaline Falls	-1.0
Auburn	25.0	Methow 2 W	1.0
Battleground	19.0	Mountlake Terrace	22.0
Bellevue	24.0	Mt. Spokane Summit	-2.0
Bellingham 2N	19.0	Mount Vernon 3 WNW	20.0
Benton City 2 NW	11.0	Moxee City 10 E	8.0
Bickleton	4.0	Mud Mtn. Dam	23.0
Blaine	17.0	Nespelem 2 S	-4.0
Bothell 2 N	17.0	Newhalem	19.0
Bremerton	29.0	Newport	-5.0
Brier	24.0	Normandy Park	24.0
Buckley 1 NE	26.0	Northport	2.0
Bumping Lake	-5.0	Oak Harbor	16.0
Burlington	19.0	Oakville	20.0
Camas	21.0	Odessa	7.0
Castle Rock	23.0	Olga 2 SE	24.0
Cedar Lake	20.0	Olympia, AP.	17.0
Centralia	21.0	Omak 2 NW	3.0
Central Park	27.0	Opportunity	8.0
Chehalis	21.0	Oroville	5.0
Chelan	10.0	Othello	9.0
Cheney	4.0	Packwood	16.0
Chesaw	-11.0	Palmer 3 SE	22.0
Chewalah 2 S	-9.0	Parkland	20.0
Chief Joseph Dam	6.0	Pasco	13.0
Clallam Bay 1 NNE	28.0	Plain	-3.0
Clarkston	10.0	Pleasant View	16.0
Clearbrook	19.0	Pt. Grenville	27.0
Clearwater	26.0	Pomeroy	3.0
Cle Elum	1.0	Port Angeles	28.0
Clyde Hill	24.0	Port Orchard	29.0
Colfax 1 NW	2.0	Pon Townsend	25.0
College Place	6.0	Priest Rapids Dam	14.0
Colville AP	-2.0	Prosser	12.0
Conconully	-7.0	Pullman Exp. Sta.	1.0
Concrete	19.0	Puyallup	19.0
Connell 4 NNW	6.0	Quilcene 2 SW	23.0
Cougar 5 E	25.0	Quillayute AP	23.0
Coulee Dam 1 SW	9.0	Quinault RS	25.0
Coupeville 1 S	21.0	Quincy 1 NE	4.0

Cushman Dam	22.0	Rainier, Longmire	15.0
Dallesport AP	14.0	Paradise RS	8.0
Darrington RS	13.0	Raymond	28.0
Davenport	5.0	Redmond	17.0
Dayton 1 WSW	5.0	Renton	24.0
Deer Park 2 E	-5.0	Republic	-9.0
Des Moines	25.0	Richland	11.0
Diablo Dam	15.0	Rimrock Tieton Dam	4.0
Dishman	9.0	Ritzville	6.0
East Bremerton	29.0	Rosalia	6.0
Edmonds	24.0	Ross Dam	14.0
Electron Headwks	16.0	St. John	15.0
Ellensburg AP	2.0	Sappho 8 E	23.0
Elma	24.0	Satus Pass	10.0
Eltopia 6 W	9.0	Seattle: Sea-Tac AP	24.0
Elwha RS	24.0	Sedro Woolley 1 E	19.0
Enumclaw	26.0	Selah	11.0
Ephrata AP	7.0	Sequim	23.0
Everett JC	23.0	Shelton	23.0
Everett Paine AFB	21.0	Shoultes	23.0
Fircrest	29.0	Skamania Fish Hatch.	24.0
Forks I E	23.0	Smyrna	8.0
Fort Lewis	24.0	Snohomish	21.0
Fruitvale	1.1	Snoqualmie Falls	22.0
Glacier RS	13.0	Snoqualmie Pass	6.0
Glenoma (Kosmos)	18.0	South Broadway	11.0
Goldendale	7.0	So. Olympic Tree Farm	24.0
Grandview	12.0	Spanaway	20.0
Grapeview	30.0	Spokane AP	4.0
Grayland 2 S	28.0	Spokane CO	10.0
Grays River Hatchery	24.0	Spokane Fairchild AFB	4.0
Greenwater	1.4	Sprague	4.0
Grotto	21.0	Stampede Pass	7.0
Harrington 2 S	3.0	Startup 1 E	20.0
Hartline	7.0	Stehekin 3 NW	12.0
Hatton 8 E	1.0	Steilacoom	21.0
Holden Village	4.0	Stevens Pass	6.0
Hoquiam AP	26.0	Stockdill Ranch	-14.0
Ice Harbor Dam	17.0	Sumner	19.0
Inchelium 2 NW	0.0	Sunnyside	12.0
Issaquah	23.0	Tacoma McChord	21.0
John Day Dam	19.0	Tacoma CO	29.0
Kelso AP	24.0	Tatoosh Island	31.0
Kennewick 10 SW	13.0	Thompson Place	20.0
Kent	21.0	Tietort Intake	6.0
Kid Valley	20.0	Toledo AP	17.0
Kirkland	17.0	Toppenish	11.0

Lacey	17.0	Trinidad 2 SSE	13.0
Lacrosse 3 ESE	-3.0	Tukwila	24.0
La Grande	23.0	Tumwater	17.0
Lake Cle Elum	-4.0	University Place	29.0
Lake Forest Park	20.0	Upper Baker Dam	14.0
Lake Kachess	-2.0	Vancouver	22.0
Lake Keechelus	0.0	Vashon Island	28.0
Lakewood Center	23.0	Walla Walla AP	6.0
Landsburg	18.0	Walla Walla CO	13.0
Larson AFB	6.0	Wapato	10.0
Laurier	-8.0	Washougal 8 ENE	21.0
Leavenworth	-3.0	Waterville	1.0
Lemanasky Lake	-7.0	Wawawai 2 NW	14.0
Lind 3 NE	6.0	Wellpinit	1.0
Linwood	10.0	Wenatchee AP	13.0
Little Goose Dam	22.0	Wenatchee CO	10.0
Long Beach 3 NNE	25.0	West Clarkston	10.0
Longview	24.0	Whidbey Island	11.0
Lower Granite Dam	14.0	White River RS	12.0
Lower Monument Dam	18.0	White Swan RS	8.0
Lynden	18.0	Whitman Mission	11.0
Lynnwood	24.0	Wilbur	4.0
Maloft	4.0	Willapa Harbor	26.0
Marietta 3 NNW	18.0	Wilson Creek	3.0
Marysville	23.0	Wind River	15.0
McMillin Res.	21.0	Winthrop 1 WSW	-12.0
McNary Dam	11.0	Yakima AP	11.0

Glazing Schedule

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Contact Information

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Sheri Newbold
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Conditioned Floor Area	2206
Sum of All Glazing Areas From Below	351
Glazing to Floor Area Ratio	15.92%

Sum of UA for Heating System Sizing 117.9

Exterior Doors

Plan ID	Component Description	Ref.	Door U-factor	Percent Glazed	Qt.	Width Feet	Inch	Height Feet	Inch	Glazing Area	Door Area	Door UA
1	SOLID	MARVIN	0.20	0%	1	3	0	6	8	0.0	20.0	4.0
3	LOW-E GLASS	MARVIN	0.30	61%	1	6	0	6	8	40.0	40.0	12.0
7	LOW-E GLASS	MARVIN	0.30	56%	1	5	0	6	8	33.3	33.3	10.0
9	SOLID	MARVIN	0.20	0%	1	3	0	6	8	0.0	20.0	4.0
	One Exempt Swinging Door < 24 Square Feet								0	0.0	0.0	0.0

Sum of Glazing Area, Door Area, and UA (do not include exempt door) 73.3 113.3 30.0

Area Weighted U = UA/Area 0.26

Sum of Area and UA for Heating system size only (include exempt door) 73.3 113.3 30.0

Vertical Glazing

Plan ID	Component Description	Ref.	Glazing U-factor	Qt.	Width Feet	Inch	Height Feet	Inch	Glazing Area	UA
A	(2) DBL HUNG + FXD		0.30	1		112.125		58.5	45.6	13.67
B	SLIDER		0.30	1		47		24	7.8	2.35
C	SLIDER		0.30	1		34		34	8.0	2.41
D	DBL HUNG		0.30	1		35.75		47	11.7	3.50
E	DBL HUNG		0.30	1		35.75		47	11.7	3.50
F	(2) DBL HUNG		0.30	1		48.75		47	15.9	4.77
G	(2) DBL HUNG		0.30	1		48.75		47	15.9	4.77
H	(2) DBL HUNG		0.30	1		48.75		47	15.9	4.77
J	(2) DBL HUNG		0.30	1		48.75		47	15.9	4.77
K	DBL HUNG		0.30	1		35.75		47	11.7	3.50
L	DBL HUNG		0.30	1		30		48	10.0	3.00
M	DBL HUNG		0.30	1		30		48	10.0	3.00
N	AWNING		0.30	1		30		24	5.0	1.50
P	SLIDER		0.30	1		68.875		33.25	15.9	4.77
Q	SLIDER		0.30	1		94.125		33.75	22.1	6.62
R	SLIDER		0.30	1		70.25		33.75	16.5	4.94
									0.0	0.00
									0.0	0.00
									0.0	0.00
									0.0	0.00
									0.0	0.00

Sum of Area and UA 239.5 71.85
 Area Weighted U = UA/Area 0.30

Overhead Glazing

Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Inch	Height Feet	Inch	Area	UA
S	SKYLIGHT		0.42	1			24		44.125	3.1
T	SKYLIGHT		0.42	1			24		44.125	3.1
V	SKYLIGHT		0.42	1			24		44.125	3.1
W	SKYLIGHT		0.42	1			24		44.125	3.1
Y	SKYLIGHT		0.42	1			24		44.125	3.1
Z	SOLATUBE		0.42	1		14.75		14.75	1.5	0.6
									0.0	0.0

Sum of Area and UA 38.3 16.1
 Area Weighted U = UA/Area 0.42