

*Krasnoyarsk
HVAC Load Calculations*

for

KRASVZRIVPROM

Elite Software

RHVAC RESIDENTIAL
HVAC LOADS

Prepared By:

Vladimir
HVAC SPB

8(812)954-17-67
6 Апрель 2010 г.



Project Report

General Project Information

Project Title: Krasnoyarsk
 Designed By: Vladimir
 Project Date: 12.14.2008
 Client Name: KRASVZRIVPROM
 Company Name: HVAC SPB
 Company Representative: Vladimir
 Company Phone: 8(812)954-17-67
 Company E-Mail Address: expert@rhvac.ru
 Company Website: www.rhvac.ru
 Company Comment:

Design Data

Reference City: Krasnoyarsk, _Russia
 Daily Temperature Range: Medium
 Latitude: 56 Degrees
 Elevation: 908 ft.
 Altitude Factor: 0,968
 Elevation Sensible Adj. Factor: 1,000
 Elevation Total Adj. Factor: 1,000
 Elevation Heating Adj. Factor: 1,000
 Elevation Heating Adj. Factor: 1,000

	Outdoor Dry Bulb	Outdoor Wet Bulb	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	-45	0	30	72	36
Summer:	95	63	50	75	-29

Check Figures

Total Building Supply CFM:	2 000	CFM Per Square ft.:	0,635
Square ft. of Room Area:	3 152	Square ft. Per Ton:	1 100
Volume (ft?) of Cond. Space:	31 033		

Building Loads

Total Heating Required Including Ventilation Air:	110 531 Btuh	110,531 MBH
Total Sensible Gain:	25 782 Btuh	128 %
Total Latent Gain:	-5 635 Btuh	-28 %
Total Cooling Required Including Ventilation Air:	20 147 Btuh	1,68 Tons (Based On Sensible + Latent)
		2,86 Tons (Based On 75% Sensible Capacity)

Notes

Calculations are based on 8th edition of ACCA Manual J.
 All computed results are estimates as building use and weather may vary.
 Be sure to select a unit that meets both sensible and latent loads.



Load Preview Report

Scope	Has AED	Net Ton	Rec Ton	ft.? /Ton	Area	Sen Gain	Lat Gain	Net Gain	Sen Loss	Min Htg CFM	Min Clg CFM	Sys Htg CFM	Sys Clg CFM	Sys Act CFM	Duct Size
Building		1,68	2,86	1 100	3 152	25 782	-5 635	20 147	110 531	1 320	1 113	1 700	2 000	2 000	
System 1	Yes	1,68	2,86	1 100	3 152	25 782	-5 635	20 147	110 531	1 320	1 113	1 700	2 000	2 000	18x18
Ventilation						2 086	-1 876	211	12 204						
Duct Latent							-2 175	-2 175							
Humidification									6 184						
Zone 1					1 388	20 714	-580	20 134	38 510	552	973	710	1 037	1 037	12x15
6-Bedroom 1					180	3 787	-130	3 657	7 455	107	178	138	190	190	2-6
10-Kitchen					141	3 019	-130	2 889	7 504	107	142	138	151	151	1-7
11-Living Room					538	9 939	-173	9 766	14 134	202	467	261	498	498	5-6
16-Living					331	3 652	-147	3 505	8 268	118	172	153	183	183	2-6
17-Recreation Room					198	317	0	317	1 149	16	15	21	16	16	1-4
Zone 2					363	9 781	-173	9 608	14 846	213	459	274	490	490	9x12
2-Game Room					363	9 781	-173	9 608	14 846	213	459	274	490	490	4-7
Zone 3					1 401	9 436	-831	8 605	38 787	556	443	716	473	473	8x12
1-Storage					144	3 286	-131	3 155	6 812	98	154	126	165	165	1-8
3-Basement					144	582	-131	451	4 865	70	27	90	29	29	1-4
4-Laundry					216	227	-71	156	2 648	38	11	49	11	11	1-4
5-Laundry					234	239	-75	164	2 802	40	11	52	12	12	1-4
7-Storage Room					105	422	-62	360	2 613	37	20	48	21	21	1-4
8-Bath 1					98	500	-31	469	2 287	33	23	42	25	25	1-4
9-Entry					45	329	-52	277	2 162	31	15	40	16	16	1-4
12-Bedroom 2					130	1 014	-71	943	4 852	69	48	90	51	51	1-4
13-Bath 2					60	231	-43	188	1 615	23	11	30	12	12	1-4
14-Bedroom 3					115	822	-83	739	4 103	59	39	76	41	41	1-4
15-Hall					110	1 786	-81	1 705	4 028	58	84	74	89	89	1-6
Sum of room airflows may be greater than system airflow because system has multiple zones.															



Total Building Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
1E-cw: Glazing-Double pane window, fixed sash, clear, wood frame, outdoor insect screen with 100% coverage, light color drapes with medium weave with 50% coverage, u-value 0,56, SHGC 0,66	530,8	34 778	0	16 706	16 706
11P: Door-Metal - Polyurethane Core	59	2 004	0	531	531
14B1-6.5s: Wall-structural insulated panel (SIP), R -3.85 per inch EPS core, stucco or wood siding, interior finish, 6.5 inch R-23.04 SIP panels	3455	19 000	0	2 760	2 760
17A1-6: Roof/Ceiling-Roof Deck (roofing, wood, insulation) or SIP Panels Supported on Beams, Structural Insulated Panels (SIPs), R -3.85 per Inch EPS Core, Dark or Bold-Color Asphalt Shingle, Dark Metal, Dark Membrane, Dark Tar and Gravel, 6.5 inch R-23.04 SIP panels	944,7	4 974	0	1 488	1 488
21B-20: Floor-Basement, Concrete slab, any thickness, 2 or more feet below grade, R-3 or higher insulation installed below floor, any floor cover, shortest side of floor slab is 20' wide	1100,5	2 446	0	0	0
Subtotals for structure:		63 202	0	21 485	21 485
People:	0		0	0	0
Equipment:			0	0	0
Lighting:	0			0	0
Ductwork:		8 329	-2 175	450	-1 725
Infiltration: Winter CFM: 166, Summer CFM: 83		20 612	-1 584	1 760	176
Ventilation: Winter CFM: 98, Summer CFM: 98		12 204	-1 876	2 086	211
Humidification (Winter) 16,86 gal/day :		6 184	0	0	0
Total Building Load Totals:		110 531	-5 635	25 782	20 147

Check Figures

Total Building Supply CFM:	2 000	CFM Per Square ft.:	0,635
Square ft. of Room Area:	3 152	Square ft. Per Ton:	1 100
Volume (ft?) of Cond. Space:	31 033		

Building Loads

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Total Cooling Required Including Ventilation Air:	20 147 Btuh	1,68 Tons (Based On Sensible + Latent)
		2,86 Tons (Based On 75% Sensible Capacity)

Notes

Calculations are based on 8th edition of ACCA Manual J.
All computed results are estimates as building use and weather may vary.
Be sure to select a unit that meets both sensible and latent loads.



System 1 Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
1E-cw: Glazing-Double pane window, fixed sash, clear, wood frame, outdoor insect screen with 100% coverage, light color drapes with medium weave with 50% coverage, u-value 0,56, SHGC 0,66	530,8	34 778	0	16 706	16 706
11P: Door-Metal - Polyurethane Core	59	2 004	0	531	531
14B1-6.5s: Wall-structural insulated panel (SIP), R -3.85 per inch EPS core, stucco or wood siding, interior finish, 6.5 inch R-23.04 SIP panels	3455	19 000	0	2 760	2 760
17A1-6: Roof/Ceiling-Roof Deck (roofing, wood, insulation) or SIP Panels Supported on Beams, Structural Insulated Panels (SIPs), R -3.85 per Inch EPS Core, Dark or Bold-Color Asphalt Shingle, Dark Metal, Dark Membrane, Dark Tar and Gravel, 6.5 inch R-23.04 SIP panels	944,7	4 974	0	1 488	1 488
21B-20: Floor-Basement, Concrete slab, any thickness, 2 or more feet below grade, R-3 or higher insulation installed below floor, any floor cover, shortest side of floor slab is 20' wide	1100,5	2 446	0	0	0
Subtotals for structure:		63 202	0	21 485	21 485
People:	0		0	0	0
Equipment:			0	0	0
Lighting:	0			0	0
Ductwork:		8 329	-2 175	450	-1 725
Infiltration: Winter CFM: 166, Summer CFM: 83		20 612	-1 584	1 760	176
Ventilation: Winter CFM: 98, Summer CFM: 98		12 204	-1 876	2 086	211
Humidification (Winter) 16,86 gal/day :		6 184	0	0	0
System 1 Load Totals:		110 531	-5 635	25 782	20 147

Check Figures

Supply CFM:	2 000	CFM Per Square ft.:	0,635
Square ft. of Room Area:	3 152	Square ft. Per Ton:	1 100
Volume (ft?) of Cond. Space:	31 033		

System Loads

Total Heating Required Including Ventilation Air:	110 531 Btuh	110,531 MBH
Total Sensible Gain:	25 782 Btuh	128 %
Total Latent Gain:	-5 635 Btuh	-28 %
Total Cooling Required Including Ventilation Air:	20 147 Btuh	1,68 Tons (Based On Sensible + Latent)
		2,86 Tons (Based On 75% Sensible Capacity)

Notes

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All computed results are estimates as building use and weather may vary.
Be sure to select a unit that meets both sensible and latent loads.



System 1, Zone 1 Summary Loads (Peak Load Procedure for Rooms)

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
1E-cw: Glazing-Double pane window, fixed sash, clear, wood frame, outdoor insect screen with 100% coverage, light color drapes with medium weave with 50% coverage, u-value 0,56, SHGC 0,66	275,9	18 077	0	9 146	9 146
14B1-6.5s: Wall-structural insulated panel (SIP), R -3.85 per inch EPS core, stucco or wood siding, interior finish, 6.5 inch R-23.04 SIP panels	1204,4	6 623	0	963	963
17A1-6: Roof/Ceiling-Roof Deck (roofing, wood, insulation) or SIP Panels Supported on Beams, Structural Insulated Panels (SIPs), R -3.85 per Inch EPS Core, Dark or Bold-Color Asphalt Shingle, Dark Metal, Dark Membrane, Dark Tar and Gravel, 6.5 inch R-23.04 SIP panels	529,1	2 786	0	834	834
Subtotals for structure:		27 486	0	19 835	19 835
People:	0		0	0	0
Equipment:			0	0	0
Lighting:	0			0	0
Ductwork:		3 481	0	234	234
Infiltration: Winter CFM: 61, Summer CFM: 30		7 543	-580	645	65
System 1, Zone 1 Load Totals:		38 510	-580	20 714	20 134

Check Figures

Supply CFM:	1 037	CFM Per Square ft.:	0,747
Square ft. of Room Area:	1 388	Square ft. Per Ton:	752
Volume (ft?) of Cond. Space:	13 666		

Zone Loads

Total Heating Required:	38 510 Btuh	38,510 MBH
Total Sensible Gain:	20 714 Btuh	103 %
Total Latent Gain:	-580 Btuh	-3 %
Total Cooling Required:	20 134 Btuh	1,68 Tons (Based On Sensible + Latent)
		1,85 Tons (Based On 75% Sensible Capacity)

Notes

Calculations are based on 8th edition of ACCA Manual J.
All computed results are estimates as building use and weather may vary.
Be sure to select a unit that meets both sensible and latent loads.



System 1, Zone 2 Summary Loads (Peak Load Procedure for Rooms)

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
1E-cw: Glazing-Double pane window, fixed sash, clear, wood frame, outdoor insect screen with 100% coverage, light color drapes with medium weave with 50% coverage, u-value 0,56, SHGC 0,66	133,7	8 759	0	4 303	4 303
14B1-6.5s: Wall-structural insulated panel (SIP), R -3.85 per inch EPS core, stucco or wood siding, interior finish, 6.5 inch R-23.04 SIP panels	307,5	1 691	0	246	246
21B-20: Floor-Basement, Concrete slab, any thickness, 2 or more feet below grade, R-3 or higher insulation installed below floor, any floor cover, shortest side of floor slab is 20' wide	362,5	806	0	0	0
Subtotals for structure:		11 256	0	9 479	9 479
People:	0		0	0	0
Equipment:			0	0	0
Lighting:	0			0	0
Ductwork:		1 342	0	110	110
Infiltration: Winter CFM: 18, Summer CFM: 9		2 248	-173	192	19
System 1, Zone 2 Load Totals:		14 846	-173	9 781	9 608

Check Figures

Supply CFM:	490	CFM Per Square ft.:	1,350
Square ft. of Room Area:	363	Square ft. Per Ton:	427
Volume (ft?) of Cond. Space:	3 568		

Zone Loads

Total Heating Required:	14 846 Btuh	14,846 MBH
Total Sensible Gain:	9 781 Btuh	102 %
Total Latent Gain:	-173 Btuh	-2 %
Total Cooling Required:	9 608 Btuh	0,80 Tons (Based On Sensible + Latent)
		0,85 Tons (Based On 75% Sensible Capacity)

Notes

Calculations are based on 8th edition of ACCA Manual J.
All computed results are estimates as building use and weather may vary.
Be sure to select a unit that meets both sensible and latent loads.



System 1, Zone 3 Summary Loads (Peak Load Procedure for Rooms)

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
1E-cw: Glazing-Double pane window, fixed sash, clear, wood frame, outdoor insect screen with 100% coverage, light color drapes with medium weave with 50% coverage, u-value 0,56, SHGC 0,66	121,2	7 942	0	3 257	3 257
11P: Door-Metal - Polyurethane Core	59	2 004	0	531	531
14B1-6.5s: Wall-structural insulated panel (SIP), R -3.85 per inch EPS core, stucco or wood siding, interior finish, 6.5 inch R-23.04 SIP panels	1943,2	10 686	0	1 551	1 551
17A1-6: Roof/Ceiling-Roof Deck (roofing, wood, insulation) or SIP Panels Supported on Beams, Structural Insulated Panels (SIPs), R -3.85 per Inch EPS Core, Dark or Bold-Color Asphalt Shingle, Dark Metal, Dark Membrane, Dark Tar and Gravel, 6.5 inch R-23.04 SIP panels	415,6	2 188	0	654	654
21B-20: Floor-Basement, Concrete slab, any thickness, 2 or more feet below grade, R-3 or higher insulation installed below floor, any floor cover, shortest side of floor slab is 20' wide	738	1 640	0	0	0
Subtotals for structure:		24 460	0	8 407	8 407
People:	0		0	0	0
Equipment:			0	0	0
Lighting:	0			0	0
Ductwork:		3 506	0	106	106
Infiltration: Winter CFM: 87, Summer CFM: 43		10 821	-831	923	92
System 1, Zone 3 Load Totals:		38 787	-831	9 436	8 605

Check Figures

Supply CFM:	473	CFM Per Square ft.:	0,337
Square ft. of Room Area:	1 401	Square ft. Per Ton:	1 462
Volume (ft?) of Cond. Space:	13 799		

Zone Loads

Total Heating Required:	38 787 Btuh	38,787 MBH
Total Sensible Gain:	9 436 Btuh	110 %
Total Latent Gain:	-831 Btuh	-10 %
Total Cooling Required:	8 605 Btuh	0,72 Tons (Based On Sensible + Latent)
		0,96 Tons (Based On 75% Sensible Capacity)

Notes

Calculations are based on 8th edition of ACCA Manual J.
All computed results are estimates as building use and weather may vary.
Be sure to select a unit that meets both sensible and latent loads.