

HOME HEAT LOSS CALCULATIONS

U FACTORS	0.14	0.044	0.06	0.024	0.045	0.068	0.19	0.03	0.4	0.41		
AT	14	28	103	103	193	103	10	103	103	103		
CROSS SECTION TYPE	FLAT ROOF UNEXP. CONC WALL	UNEXP. CONC. WALL	EXPOSED CONC. WALL	EXPOSED 10" FRAMED WALL	EXPOSED 6" FRAMED WALL	EXPOSED 4" FRAMED WALL	FLOOR	CEILING	EXPOSED DOOR	WINDOW AREA	CFM	TOTAL HEAT LOSS BTUH
MUSIC STUDIO		320.3					482.6	781.8			36.7	1584.7
MSTR BEDROOM		216.8		47.0			399.0	648.9		1915.8	74.7	3227.5
MSTR BATH		104.7					174.8	284.3			13.1	563.8
HALLWAY							106.4	173.0			6.5	279.4
UTILITY		59.1					110.2	179.2			8.1	348.6
SERVER							60.8	98.9			3.7	159.7
VAULT		103.5					136.8	222.5			10.7	462.8
OFFICE		73.9					199.5	324.5			13.8	597.9
BEDROOM #2		39.4		34.6			288.8	469.7		1359.6	50.7	2192.1
DINING/LIVING				202.7			1143.8	1860.2	824.0	8652.0	293.6	12682.7
KITCHEN		83.8					197.6	321.4			14.0	602.7
TOTAL HOME HEAT LOSS IN BRITISH THERMAL UNITS PER HOUR										TOTAL	525.5	22701.8

Heating Duct Size Calculations

Earth Sheltered Technology, Inc.
1219 North Riverfront Drive
Mankato, Minnesota 56001

Name: _____

By: ALH

MINIMUM SUPPLY AND RETURN DUCT SIZES FOR RESIDENTIAL APPLICATION

Supply Ducts				Return Ducts		
CFM	Round	Rectangular	Riser	Round	Rectangular	Riser
50	5"	8 x 6	10 x 3 1/4	6"	8 x 6	10 x 3 1/4
75	6"	8 x 6	10 x 3 1/4	7"	8 x 6	12 x 3 1/4
100	6"	8 x 6	10 x 3 1/4	8"	8 x 6	14 x 3 1/4
125	7"	8 x 6	12 x 3 1/4	8"	8 x 8	
150	7"	8 x 6	14 x 3 1/4	9"	8 x 8	
175	8"	8 x 6		9"	10 x 8	
200	8"	8 x 8		10"	8 x 10 10 x 8	
250	9"	8 x 8		12"	10 x 10 12 x 8	
300	10"	8 x 10 10 x 8		12"	10 x 10 14 x 8	
350	10"	8 x 10 10 x 8		12"	12 x 10 16 x 8	
400	10"	10 x 10 12 x 8		12"	14 x 10 16 x 8	
500	12"	10 x 10 14 x 8		14"	16 x 10 20 x 8	
600	12"	12 x 10 14 x 8		16"	18 x 10 24 x 8	
700	12"	14 x 10 16 x 8		16"	20 x 10 26 x 8	
800	14"	16 x 10 20 x 8		16"	22 x 10 30 x 8	
900	14"	16 x 10 22 x 8		18"	24 x 10 32 x 8	
1,000	16"	18 x 10 24 x 8		18"	26 x 10 22 x 12	
1,200	16"	22 x 10 28 x 8		20"	30 x 10 24 x 12	
1,400	18"	26 x 10 22 x 12		20"	36 x 10 28 x 12	
1,600	18"	28 x 10 24 x 12		22"	40 x 10 32 x 12	
1,800	20"	32 x 10 24 x 12		22"	28 x 14 36 x 12	
2,000	20"	34 x 10 26 x 12		24"	32 x 14 38 x 12	
2,500	22"	40 x 10 32 x 12		26"	38 x 14 46 x 12	
3,000	24"	32 x 14 38 x 12		26"	44 x 14 38 x 16	
3,500	24"	36 x 14 44 x 12		28"	50 x 14 42 x 16	
4,000	26"	40 x 14 48 x 12		30"	56 x 14 48 x 16	

HEAT LOSS CALCULATIONS

Room MUSIC STUDIO

Flat Roof Unexposed Conc. Wall:

0 S.F. (x) .14 (x) 14 = 0.0 BTUH

Unexposed Conc. Wall:

260 S.F. (x) .044 (x) 28 = 320.3 BTUH

Exposed Conc. Wall:

0 S.F. (x) .06 (x) 103 = 0.0 BTUH

Exposed Framed Wall:

0 S.F. (x) .024 (x) 103 = 0.0 BTUH

Floor:

254 S.F. (x) .19 (x) 10 = 482.6 BTUH

Ceiling:

253 S.F. (x) .03 (x) 103 = 781.8 BTUH

Door:

0 S.F. (x) .4 (x) 103 = 0.0 BTUH

Window:

0 S.F. (x) .3 (x) 103 = 0.0 BTUH

TOTAL BTUH 1584.7 = 36.7 CFM
43.2

Room MSTR BEDROOM

Flat Roof Unexposed Conc. Wall:

0 S.F. (x) .14 (x) 14 = 0.0 BTUH

Unexposed Conc. Wall:

176 S.F. (x) .044 (x) 28 = 216.8 BTUH

Exposed Conc. Wall:

0 S.F. (x) .06 (x) 103 = 0.0 BTUH

Exposed Framed Wall:

19 S.F. (x) .024 (x) 103 = 47.0 BTUH

Floor:

210 S.F. (x) .19 (x) 10 = 399.0 BTUH

Ceiling:

210 S.F. (x) .03 (x) 103 = 648.9 BTUH

Door:

0 S.F. (x) .4 (x) 103 = 0.0 BTUH

Window:

62 S.F. (x) .3 (x) 103 = 1915.8 BTUH

TOTAL BTUH 3227.5 = 74.7 CFM
43.2

HEAT LOSS CALCULATIONS

Room MSTR BATH

Flat Roof Unexposed Conc. Wall:

0 S.F. (x) .14 (x) 14 = 0.0 BTUH

Unexposed Conc. Wall:

85 S.F. (x) .044 (x) 28 = 104.7 BTUH

Exposed Conc. Wall:

0 S.F. (x) .06 (x) 103 = 0.0 BTUH

Exposed Framed Wall:

0 S.F. (x) .024 (x) 103 = 0.0 BTUH

Floor:

92 S.F. (x) .19 (x) 10 = 174.8 BTUH

Ceiling:

92 S.F. (x) .03 (x) 103 = 284.3 BTUH

Door:

0 S.F. (x) .4 (x) 103 = 0.0 BTUH

Window:

0 S.F. (x) .3 (x) 103 = 0.0 BTUH

TOTAL BTUH 563.8 = 13.1 CFM
43.2

Room HALLWAY

Flat Roof Unexposed Conc. Wall:

0 S.F. (x) .14 (x) 14 = 0.0 BTUH

Unexposed Conc. Wall:

0 S.F. (x) .044 (x) 28 = 0.0 BTUH

Exposed Conc. Wall:

0 S.F. (x) .06 (x) 103 = 0.0 BTUH

Exposed Framed Wall:

0 S.F. (x) .024 (x) 103 = 0.0 BTUH

Floor:

56 S.F. (x) .19 (x) 10 = 106.4 BTUH

Ceiling:

56 S.F. (x) .03 (x) 103 = 173.0 BTUH

Door:

0 S.F. (x) .4 (x) 103 = 0.0 BTUH

Window:

0 S.F. (x) .3 (x) 103 = 0.0 BTUH

TOTAL BTUH 279.4 = 6.5 CFM
43.2

HEAT LOSS CALCULATIONS

Room UTILITY

Flat Roof Unexposed Conc. Wall:

0 S.F. (x) .14 (x) 14 = 0.0 BTUH

Unexposed Conc. Wall:

48 S.F. (x) .044 (x) 28 = 59.1 BTUH

Exposed Conc. Wall:

0 S.F. (x) .06 (x) 103 = 0.0 BTUH

Exposed Framed Wall:

0 S.F. (x) .024 (x) 103 = 0.0 BTUH

Floor:

58 S.F. (x) .19 (x) 10 = 110.2 BTUH

Ceiling:

58 S.F. (x) .03 (x) 103 = 179.2 BTUH

Door:

0 S.F. (x) .4 (x) 103 = 0.0 BTUH

Window:

0 S.F. (x) .3 (x) 103 = 0.0 BTUH

TOTAL BTUH 348.6 = 8.1 CFM
43.2

Room SERVER

Flat Roof Unexposed Conc. Wall:

0 S.F. (x) .14 (x) 14 = 0.0 BTUH

Unexposed Conc. Wall:

0 S.F. (x) .044 (x) 28 = 0.0 BTUH

Exposed Conc. Wall:

0 S.F. (x) .06 (x) 103 = 0.0 BTUH

Exposed Framed Wall:

0 S.F. (x) .024 (x) 103 = 0.0 BTUH

Floor:

32 S.F. (x) .19 (x) 10 = 60.8 BTUH

Ceiling:

32 S.F. (x) .03 (x) 103 = 98.9 BTUH

Door:

0 S.F. (x) .4 (x) 103 = 0.0 BTUH

Window:

0 S.F. (x) .3 (x) 103 = 0.0 BTUH

TOTAL BTUH 159.7 = 3.7 CFM
43.2

HEAT LOSS CALCULATIONS

Room VAULT

Flat Roof Unexposed Conc. Wall:

0 S.F. (x) .14 (x) 14 = 0.0 BTUH

Unexposed Conc. Wall:

84 S.F. (x) .044 (x) 28 = 103.5 BTUH

Exposed Conc. Wall:

0 S.F. (x) .06 (x) 103 = 0.0 BTUH

Exposed Framed Wall:

0 S.F. (x) .024 (x) 103 = 0.0 BTUH

Floor:

72 S.F. (x) .19 (x) 10 = 136.8 BTUH

Ceiling:

72 S.F. (x) .03 (x) 103 = 222.5 BTUH

Door:

0 S.F. (x) .4 (x) 103 = 0.0 BTUH

Window:

0 S.F. (x) .3 (x) 103 = 0.0 BTUH

TOTAL BTUH 462.8 = 10.7 CFM
43.2

Room OFFICE

Flat Roof Unexposed Conc. Wall:

0 S.F. (x) .14 (x) 14 = 0.0 BTUH

Unexposed Conc. Wall:

60 S.F. (x) .044 (x) 28 = 73.9 BTUH

Exposed Conc. Wall:

0 S.F. (x) .06 (x) 103 = 0.0 BTUH

Exposed Framed Wall:

0 S.F. (x) .024 (x) 103 = 0.0 BTUH

Floor:

105 S.F. (x) .19 (x) 10 = 199.5 BTUH

Ceiling:

105 S.F. (x) .03 (x) 103 = 324.5 BTUH

Door:

0 S.F. (x) .4 (x) 103 = 0.0 BTUH

Window:

0 S.F. (x) .3 (x) 103 = 0.0 BTUH

TOTAL BTUH 597.9 = 13.8 CFM
43.2

HEAT LOSS CALCULATIONS

Room BEDROOM #2

Flat Roof Unexposed Conc. Wall:

0 S.F. (x) .14 (x) 14 = 0.0 BTUH

Unexposed Conc. Wall:

32 S.F. (x) .044 (x) 28 = 39.4 BTUH

Exposed Conc. Wall:

0 S.F. (x) .06 (x) 103 = 0.0 BTUH

Exposed Framed Wall:

14 S.F. (x) .024 (x) 103 = 34.6 BTUH

Floor:

152 S.F. (x) .19 (x) 10 = 288.8 BTUH

Ceiling:

152 S.F. (x) .03 (x) 103 = 469.7 BTUH

Door:

0 S.F. (x) .4 (x) 103 = 0.0 BTUH

Window:

44 S.F. (x) .3 (x) 103 = 1359.6 BTUH

TOTAL BTUH 2192.1 = 50.7 CFM
43.2

Room DINING/LIVING

Flat Roof Unexposed Conc. Wall:

0 S.F. (x) .14 (x) 14 = 0.0 BTUH

Unexposed Conc. Wall:

0 S.F. (x) .044 (x) 28 = 0.0 BTUH

Exposed Conc. Wall:

0 S.F. (x) .06 (x) 103 = 0.0 BTUH

Exposed Framed Wall:

82 S.F. (x) .024 (x) 103 = 202.7 BTUH

Floor:

602 S.F. (x) .19 (x) 10 = 1143.8 BTUH

Ceiling:

602 S.F. (x) .03 (x) 103 = 1860.2 BTUH

Door:

20 S.F. (x) .4 (x) 103 = 824.0 BTUH

Window:

280 S.F. (x) .3 (x) 103 = 8652.0 BTUH

TOTAL BTUH 12682.7 = 293.6 CFM
43.2

HEAT LOSS CALCULATIONS

Room KITCHEN

Flat Roof Unexposed Conc. Wall:

0 S.F. (x) .14 (x) 14 = 0.0 BTUH

Unexposed Conc. Wall:

68 S.F. (x) .044 (x) 28 = 83.8 BTUH

Exposed Conc. Wall:

0 S.F. (x) .06 (x) 103 = 0.0 BTUH

Exposed Framed Wall:

0 S.F. (x) .024 (x) 103 = 0.0 BTUH

Floor:

104 S.F. (x) .19 (x) 10 = 197.6 BTUH

Ceiling:

104 S.F. (x) .03 (x) 103 = 321.4 BTUH

Door:

0 S.F. (x) .4 (x) 103 = 0.0 BTUH

Window:

0 S.F. (x) .3 (x) 103 = 0.0 BTUH

TOTAL BTUH 602.7 = 14.0 CFM
43.2

Room

Flat Roof Unexposed Conc. Wall:

 S.F. (x) .14 (x) 14 = 2.0 BTUH

Unexposed Conc. Wall:

 S.F. (x) .044 (x) 28 = 1.2 BTUH

Exposed Conc. Wall:

 S.F. (x) .06 (x) 103 = 6.2 BTUH

Exposed Framed Wall:

 S.F. (x) .024 (x) 103 = 2.5 BTUH

Floor:

 S.F. (x) .19 (x) 10 = 1.9 BTUH

Ceiling:

 S.F. (x) .03 (x) 103 = 3.1 BTUH

Door:

 S.F. (x) .4 (x) 103 = 0.0 BTUH

Window:

 S.F. (x) .3 (x) 103 = 30.9 BTUH

TOTAL BTUH 47.7 = CFM
43.2