Heat Loss Calculations — Total Home Environment

Annex with Studio, Farm House,

Based on dwg / file ref(s). Tim Christie Architect Ltd as at July 2011.

Envelope Performance Criteria

U-values: Ext Walls:	0.11 W/m2 oC	Roof:	0.11 W/m2 oC	Party Floor:	
Party Walls:		Windows:	0.90 W/m2 oC	Party Ceiling:	
Ground Floor:	0.07 W/m2 oC	Doors:	0.90 W/m2 oC	Air Tightness:	1.00 ACH
Roof construction:	Warm		**External temperature:**		-1 oC

Heatloss Calculation - BS5449:pt 1

(assuming static conditions)

Location	Design temp (°C)	Air changes (per hour)	Room Volume	Flow rate (m³/h)	Heat Losses (watts) Fabric	Ventilation*	Total
GF Farm Office	21	0.5	58.4	29.2	192	154	347
GF WC Shower	21	0.5	15.0	7.5	30	40	69
GF Back Hall	18	0.5	37.0	18.5	53	79	133
GF Lobby	18	0.5	9.8	4.9	55	21	76
GF Utility	18	0.5	48.7	24.3	136	104	241
GF Studio	21	0.5	94.6	47.3	330	250	580
FF Loft Entrance	18	0.5	21.0	10.5	18	45	63
FF Land	18	0.5	43.7	21.9	123	94	217
0	0	0.5	0.0	0.0	0	0	0
FF Bedroom 4	18	0.5	65.9	33.0	182	141	323
FF Bedroom 4 Es	21	0.5	10.3	5.1	33	27	60
FF Bedroom 5	18	0.5	49.1	24.5	162	105	267
FF Bedroom 5 Es	21	0.5	13.1	6.6	39	35	74
0	0	0.5	0.0	0.0	0	0	0
0	0	0.5	0.0	0.0	0	0	0
0	0	0.5	0.0	0.0	0	0	0
0	0	0.5	0.0	0.0	0	0	0
0	0	0.5	0.0	0.0	0	0	0
0	0	0.5	0.0	0.0	0	0	0
0	0	0.5	0.0	0.0	0	0	0
0	0	0.5	0.0	0.0	0	0	0
0	0	0.5	0.0	0.0	0	0	0
0	0	0.5	0.0	0.0	0	0	0
0	0	0.5	0.0	0.0	0	0	0
0	0	0.5	0.0	0.0	0	0	0
Air Tightness Losses*					156		156
Total			**466.6**	**233.3**	**1,510**	**1,096**	**2,605**
					(57.9%)	*(42.1%)*	*(100.0%)*

*Note(s): ** *BS5449 allowances for uncontrolled ventilation loss are based on minimum standards of air tightness (B Reg min requirement for air permeability is 10 m³/h.m²). Furthermore, an additional allowance is not taken for incidental opening of windows and doors by the occupants. These figures can therefore be very pessimistic, possibly being in excess of 100% above current best practice.*

Heatloss Calculation - Incorporating Genvex MHRV with integral exhaust air source heat pump

Total fabric & ventilation heat losses (as above):		2,605 W		
Less 75% heat recovery of **controlled** ventilation: @	233 m3/h	1,270 W		
Less heat input from exhaust air source heat pump:		2,690 W	=	-1,355 W

Effectively, this residual heat loss represents the load required to maintain temperature under static conditions. To correctly size the maximum supplementary heating load requirement a further allowance must be made to accommodate temperature recovery (e.g. after a period of absence). This can be assumed to be an additional 50% for buildings with a low thermal inertia (eg SIP panels) and up to 100% for buildings with a high thermal inertia (eg masonry & concrete).

Schedule of Performance at various External Temperatures

(assuming static conditions)

Ext Temp (°C)	Space Heat Losses (W) Fabric	Ventilation*	Total	Total Reheat Loads (W)	Genvex HR + Heat Pump Output¥ (W)	Supplementary Heating (W)	Contribution %
-3.0	1,637	1,096	2,733	6,114	4,076	0	100
0.0	1,446	1,096	2,542	5,854	3,903	0	100
3.0	1,255	1,096	2,350	5,594	3,729	0	100
6.0	1,063	1,096	2,159	5,334	3,556	0	100
9.0	872	1,096	1,968	5,074	3,383	0	100
12.0	681	1,096	1,777	4,815	3,210	0	100
15.0	490	1,096	1,585	4,555	3,036	0	100

*Note(s): ** *BS5449 allowances for uncontrolled ventilation loss are based on minimum standards of air tightness (B Reg min requirement for air permeability is 10 m³/h.m²). Furthermore, an additional allowance is taken for incidental opening of windows and doors by the occupants. These figures can therefore be very pessimistic, possibly being in excess of 100% above current best practice.*

¥ *A working average of 75% heat recovery is assumed. The working average heat output for the heat pump is assumed.*