Heat Loss Calculations — Total Home Environment

Main Living Area, 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 Lounge	21	0.5	114.6	57.3	518	303	821
GF Hall	18	0.5	77.3	38.7	142	166	308
GF Cloaks/WC	18	0.5	8.4	4.2	19	18	37
GF Snug	21	0.5	54.9	27.5	182	145	327
GF Dining/Kitchen	21	0.5	131.7	65.9	275	348	623
GF Conservatory	21	0.5	166.9	83.5	1,505	441	1,945
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	0.5	0	0	0	0	0
FF Bedroom 1	18	0.5	72	36	382	154	536
FF Bed 1 Es/Dressing	21	0.5	32	16	68	85	153
FF Bedroom 2	18	0.5	55	27	195	117	313
FF Bedroom 2 Es	21	0.5	12	6	48	33	81
FF Top of Stairs	18	0.5	63	31	98	134	232
FF Landing Void	18	0.5	63	32	171	135	307
FF Corridor	18	0.5	49	24	28	105	133
FF Bedroom 3	18	0.5	48	24	116	102	219
FF Bedroom 3 Es	21	0.5	16	8	16	41	57
0	0	0.5	0	0	0	0	0
SF Room	18	0.5	27	13	140	57	197
SF Shower	21	0.5	10	5	46	26	72
SF Landing	21	0.5	19	10	196	51	248
0	0	0.5	0	0	0	0	0
0	0	0.5	0	0	0	0	0
Air Tightness Losses*					284.87		284.87
Total			**1018.6**	**509.3**	**4,431**	**2,461**	**6,891**
					(64.3%)	*(35.7%)*	*(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):		6,891 W	
Less 75% heat recovery of **controlled** ventilation: @	509 m3/h	2,773 W	
Less heat input from exhaust air source heat pump:		2,690 W	= 1,428 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	4,750	2,797	7,547	11,321	5,715	1,832	76
0.0	4,271	2,293	6,563	9,845	5,337	1,226	81
3.0	3,791	1,789	5,579	8,369	4,959	620	89
6.0	3,311	1,284	4,595	6,893	4,581	15	100
9.0	2,831	780	3,612	6,304	4,203	0	100
12.0	2,352	276	2,628	5,737	3,824	0	100
15.0	1,872	-228	1,644	5,169	3,446	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.*