

Date:
Project Ref Number:

21 March 2022
630



Heat Loss Calculation and Heating Distribution Summary

Design criteria for heat loss calculations

1. The Heat pump selection has been based on the information included in the document.
2. The Heat loss has been calculated in accordance with latest version of MIS3005 and using a method that complies with BS EN 12831.
3. The external design air temperature is based on localised weather data and is specified in accordance with CIBSE guide A.
4. Internal design temperatures are detailed below and are in accordance with CIBSE guide.

Room	Temperature and Ventilation Rates				
	Internal Temperature		Ventilation Change Rate		
			Old buildings	Modern buildings	New buildings
Living room	21	°C	1.5	1.0	0.5
Dining room	21	°C	1.5	1.0	0.5
Bed sitting room	21	°C	1.5	1.0	0.5
Bedroom	18	°C	1.0	1.0	0.5
Hall / landing	18	°C	2.0	1.0	0.5
Kitchen	18	°C	2.0	1.5	1.5
Bathroom	22	°C	3.0	1.5	1.5
Toilet	18	°C	3.0	1.5	1.5
Neighbouring Property	10	°C	N/A	N/A	N/A

5. Details of site location and associated data are used, see below table.

Building Location (closest for design temperature)	Cardiff	Design Ambient Temp	-1.6
		Design Ground Temp	10.6
		Altitude	67
Closest Location for degree day data	Severn Valley (Fitton)	Degree Day Data	1835
		Air Change Factor (W/m3K)	0.34

6. The below table gives details of the room by room heat loss calculation. Before proceeding, please ensure the below information looks reasonable.

Room Name	Floor area [m2]	Design Temp. [°C]	Fabric Heat Loss [kW]	Ventilation Heat Loss [kW]	Total Heat Loss [kW]	Specific Heat Loss [W/m2]
Entrance Hall	45	18	-0.20	0.39	0.20	4
Cloakroom	4	16	-0.01	0.03	0.02	6
Snug/Living Room	14	21	0.43	0.15	0.58	40
Laundry Room/Home Office	7	21	0.27	0.07	0.34	48
Cinema Room	25	21	0.34	0.25	0.59	24
Entertainment Room	30	21	0.66	0.31	0.97	32
Utility Room	6	18	0.07	0.06	0.12	19
Kitchen/Family Room	74	18	0.82	1.96	2.79	38
Landing	41	18	0.38	0.35	0.73	18
Master Bedroom	21	18	0.35	0.18	0.53	25
B1 En-suite	13	22	0.33	0.39	0.72	57
Dressing Room 1	4	18	0.07	0.03	0.10	26
Wardrobe 1	7	18	0.08	0.06	0.14	21
Wardrobe 2	7	18	0.02	0.06	0.07	10
Bedroom 2	22	18	0.29	0.18	0.47	22
En-suite 2	13	22	0.34	0.41	0.75	56
Wardrobe 3	9	18	0.03	0.08	0.11	12
Bedroom 3	16	18	0.23	0.13	0.36	23
Wardrobe 4	9	18	0.09	0.07	0.17	19
En-suite 3	9	22	0.28	0.26	0.55	63
Bedroom 4	16	18	0.23	0.13	0.36	23
Wardrobe 5	9	18	0.09	0.07	0.17	19
En-suite 4	9	22	0.28	0.26	0.55	63
Boot Room	6	18	0.16	0.05	0.21	33
-	5	22	0.19	0.16	0.35	66
-	0	0	0.00	0.00	0.00	0
-	0	0	0.00	0.00	0.00	0
-	0	0	0.00	0.00	0.00	0
-	0	0	0.00	0.00	0.00	0
-	0	0	0.00	0.00	0.00	0
Total Floor Area	420			Total Kw Loss	11.93	

Domestic Hot Water Considerations

Hot water calculations are in accordance with BS6700 allocating a capacity of 45lit per person per day. The number of people allocated has been based on the number of bedrooms plus one.

The below table gives details on hot water usage, sizing and assumptions.

No of Bedrooms	4	rooms
No of occupants/bedroom	1.00	persons
Hot water / occupant	45	litres/day
Recommended Tank Size	300	Litres
Flow temp in HW mode	55	°C
Final HP secondary HW temperature	50	°C
Full DHW cylinder recharging time	109	mins
HP SPF (at HW flow temp_in accordance with SAP 2012)	3.29	

Heat Emitter selection and Star ratings

Under latest version of MIS 3005, alternatives to current heat emitters and advice on additional insulation should be provided if a higher star rating can be achieved or is required.

When making decisions on heat emitters it is important to consider investment cost versus return on investment, estimated usage and long term efficiency.

Heat emitter selections and system design flow temperatures are based on the worst performing room identified in W/m2.

System Design

To achieve the maximum possible star rating and associated efficiency it is necessary for the system design flow temperature to be as low as possible in accordance with room insulation levels and emitter types. It is advisable for insulation levels to be as high as is feasible. Below are details of the worst performing room which will determine the system design.

Worst Performing Room	-
Specific Heat Loss for room	66 W/m2
Room Heat Loss Band	80 W/m2
System Emitter(s) Type	Radiators
System Design Flow Temp	50 °C
Likely Heat Pump SCOP (heating mode)	3.6
Minimum Required Oversize Factor	-
Star Rating for (new) system	3 Stars 0-6 Stars
Status	

Emitter detail by room

Room Name	Heat losses		New system		Actual system	
	Total Heat Loss [W]	Specific Heat Loss [W/m2]	Radiators design oversize factor	Required Output [Radiators "W" or UFH "mm" spacing]	Actual Output [Radiators "W" or UFH "mm" spacing]	Radiators actual oversize factor
Entrance Hall	198	4	-	Underfloor: 300	Underfloor: 150	-
Cloakroom	25	6	-	Underfloor: 300	Underfloor: 150	-
Snug/Living Room	577	40	-	Underfloor: 200	Underfloor: 150	-
Laundry Room/Home Office	338	48	-	Underfloor: 200	Underfloor: 150	-
Cinema Room	591	24	-	Underfloor: 300	Underfloor: 150	-
Entertainment Room	965	32	-	Underfloor: 200	Underfloor: 150	-
Utility Room	122	19	-	Underfloor: 300	Underfloor: 150	-
Kitchen/Family Room	2786	38	-	Underfloor: 200	Underfloor: 150	-
Landing	726	18	-	Underfloor: 300	Underfloor: 150	-
Master Bedroom	533	25	-	Underfloor: 300	Underfloor: 150	-
B1 En-suite	718	57	-	Underfloor: 200	Underfloor: 150	-
Dressing Room 1	96	26	-	Underfloor: 300	Underfloor: 150	-
Wardrobe 1	136	21	-	Underfloor: 300	Underfloor: 150	-
Wardrobe 2	71	10	-	Underfloor: 300	Underfloor: 150	-
Bedroom 2	472	22	-	Underfloor: 300	Underfloor: 150	-
En-suite 2	751	56	-	Underfloor: 200	Underfloor: 150	-
Wardrobe 3	108	12	-	Underfloor: 300	Underfloor: 150	-
Bedroom 3	363	23	-	Underfloor: 300	Underfloor: 150	-
Wardrobe 4	169	19	-	Underfloor: 300	Underfloor: 150	-
En-suite 3	548	63	-	Underfloor: 200	Underfloor: 150	-
Bedroom 4	363	23	-	Underfloor: 300	Underfloor: 150	-
Wardrobe 5	169	19	-	Underfloor: 300	Underfloor: 150	-
En-suite 4	548	63	-	Underfloor: 200	Underfloor: 150	-
Boot Room	210	33	-	Underfloor: 200	Underfloor: 150	-
-	347	66	-	Underfloor: 200	Underfloor: 150	-
-	0	0	-	None: 0	None: 0	-
-	0	0	-	None: 0	None: 0	-
-	0	0	-	None: 0	None: 0	-
-	0	0	-	None: 0	None: 0	-
-	0	0	-	None: 0	None: 0	-