Date: 04 October 2021
Project Ref Number: 0

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.

Temperature and Ventilation Rates					
Room	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
Bedsitting 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]
Porch	4	16	0.17	0.05	0.23	63
Reception	18	18	0.86	0.59	1.45	79
Female Toilets	7	18	0.13	0.32	0.45	67
Office GF.01	69	21	3.67	1.92	5.59	81
Office GF.02 (Industrial Sales)	24	21	1.51	0.76	2.27	96
Office GF.03 (Projects)	43	21	2.56	1.36	3.93	92
GF.04 Kitchen	13	18	-0.06	0.38	0.32	25
GF.05 (AAB Office)	14	21	0.78	0.36	1.13	81
GF.06 Design and Engineering	111	21	4.54	3.39	7.93	72
GF.07 Store Room	12	16	0.20	0.16	0.35	30
-	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
-	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
-	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
-	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
-	0	0	0.00	0.00	0.00	0

Total Floor Area	**314**	**Total Kw Loss**	**23.65**

Domestic Hot Water Considerations

Hot water calculations are in accordance with BS6700 allocating a capacity if 45lt 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	0	rooms
No of occupants/bedroom	1.00	persons
Hot water / occupant	45	litres/day
Recommended Tank Size	0	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	Office GF.02 (Industrial Sales)	
Specific Heat Loss for room	96	W/m2
Room Heat Loss Band	100	W/m2
System Emitter(s) Type	Radiators	
System Design Flow Temp	50	°C
Likely Heat Pump SCOP (heating mode)	3.7	
Minimum Required Oversize Factor	1.6	
Star Rating for (new) system	1 Stars	0-6 Stars
Status		

Emitter detail by room

Heat losses			New system		Actual system	
Room Name	**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**
Porch	226	63	2.5	Radiators: 541	Radiators: 569	2.5
Reception	1445	79	3.0	Radiators: 3468	Radiators: 2863.4	2.0
Female Toilets	450	67	-	Radiators: 0	Radiators: 0	0.0
Office GF.01	5594	81	2.0	Radiators: 10627	Radiators: 6316.2	1.1
Office GF.02 (Industrial Sales)	2270	96	1.7	Radiators: 3631	Radiators: 1722.6	0.8
Office GF.03 (Projects)	3925	92	2.0	Radiators: 7457	Radiators: 2405	0.6
GF.04 Kitchen	323	25	3.6	Radiators: 1000	Radiators: 1148.4	3.6
GF.05 (AAB Office)	1131	81	2.4	Radiators: 2149	Radiators: 2679.6	2.4
GF.06 Design and Engineering	7932	72	2.0	Radiators: 15071	Radiators: 8024.5	1.0
GF.07 Store Room	355	30	2.6	Radiators: 851	Radiators: 927.9	2.6
-	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	-
-	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	-
-	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	-
-	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	-
-	0	0	-	None: 0	None: 0	-
-	0	0	-	None: 0	None: 0	-

Proposed Heat Emitter (Radiators)

#	Room Type	Required Output [W]	Radiators selection	New Output [W]	
1	Porch	542	1 Existing Stelrad SP H450 W1200	569	
2	Reception	3468	1 Existing Quinn DC H600 W1100 + 1 New Quinn DC H400 W1600	4329	
3	Female Toilets	0		0	
4	Office GF.01	10628	1 New Quinn Triple H600 W1600 + 1 New Quinn Triple H600 W800 + 1 New Quinn Triple H600 W1600	11028	
5	Office GF.02 (Industrial Sales)	3631	1 Existing Quinn DC H600 W900 + 1 New Quinn Triple H600 W800	3928	
6	Office GF.03 (Projects)	7458	1 Existing Quinn DC H500 W1000 + 1 New Quinn DC H600 W1200 + 1 New Quinn DC H600 W2000	7787	
7	GF.04 Kitchen	1001	1 Existing Quinn DC H600 W600	1148	
8	GF.05 (AAB Office)	2149	1 Existing Quinn DC H600 W1400	2680	
9	GF.06 Design and Engineering	15071	1 New Quinn Triple H600 W1200 + 1 New Quinn Triple H600 W1600 + 3 New Quinn DC H600 W1400	15758	
10	GF.07 Store Room	852	1 Existing Quinn SC H600 W900	928	
11	-	-		0	
12	-	-		0	
13	-	-		0	
14	-	-		0	
15	-	-		0	
16	-	-		0	
17	-	-		0	
18	-	-		0	
19	-	-		0	
20	-	-		0	
21	-	-		0	
22	-	-		0	
23	-	-		0	
24	-	-		0	
25	-	-		0	
26	-	-		0	
27	-	-		0	
28	-	-		0	
29	-	-		0	
30	-	-		0	