

Technical Supplement



This technical supplement adds to the existing case study *'New Build Home in Leicestershire'* which is also available on our Document Library:

library.mitsubishielectric.co.uk

This supplement discusses how and why the Ecodan QUHZ system was selected for this new build application.

House Specifications:

- 3 Bedroom Detached New Build
- Total Floor Area: 164m²
- Storey Height: 2.7m (2 storey)
- Building Fabric U-Values:
 - Floor: 0.17 / 200mm Insulation board
 - Walls: 0.15 / Timber frame construction with mineral wool insulation
 - Roof: 0.1 / 350mm Insulation
 - Windows: 0.91 / Double glazed
- Whole House Mechanical Ventilation with Heat Recovery (MVHR): Installed
- Building Air Change Rate: 0.5 Air changes p/h
- Number of Bathrooms: Three



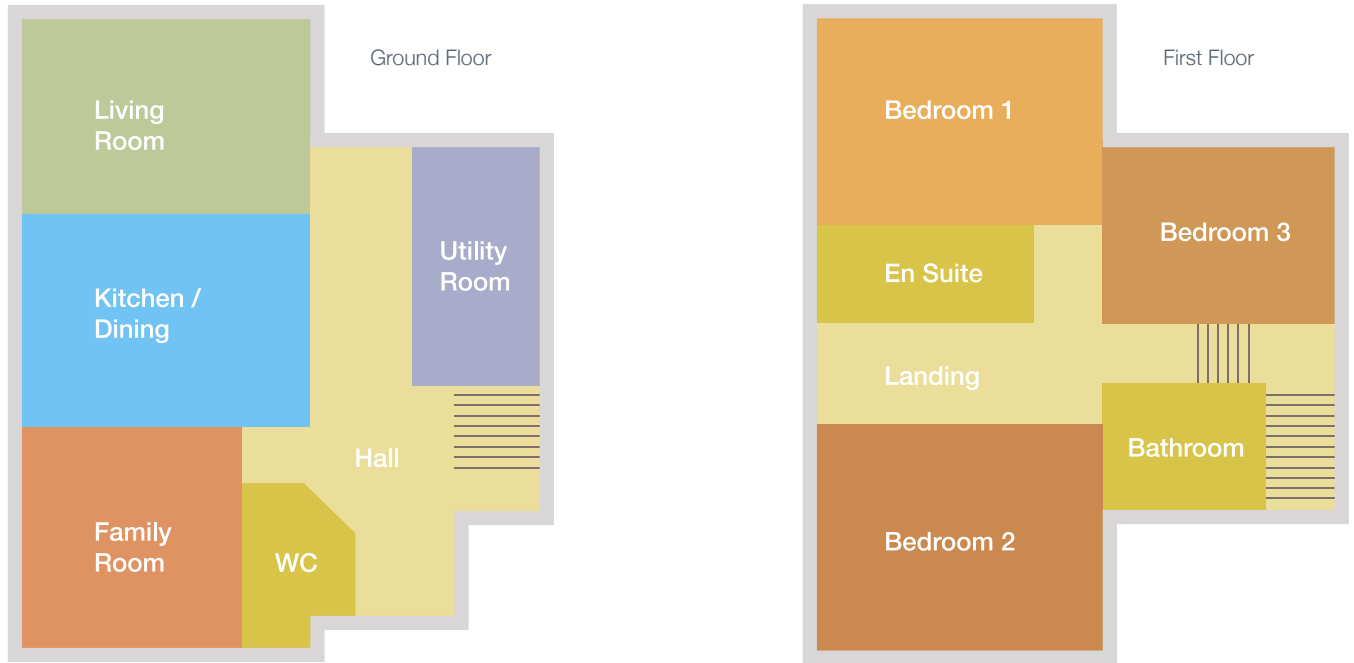
Air Conditioning | Heating
Ventilation | Controls



Heat Loss

The developer's requirement was to provide a highly efficient system which was both easy to install and able to deliver both space heating and hot water. The first consideration was the total heat loss of the building which is shown below.

Floor Plans for Heat Loss Calculation



Ground Floor = 91m² First Floor = 73m² Total Floor Area = 164m²

Heat Loss Calculations / Design ambient temperature: -3°C

Ground Floor Heat Losses	Area (m ²)	Design set-point (°C)	Heat Loss (W)
Living Room	16	21	384
Hall	16	21	384
WC	5	21	120
Family Room	18	21	432
Kitchen / Dining Room	29	21	696
Utility Room	7	21	168
Total	91		2184

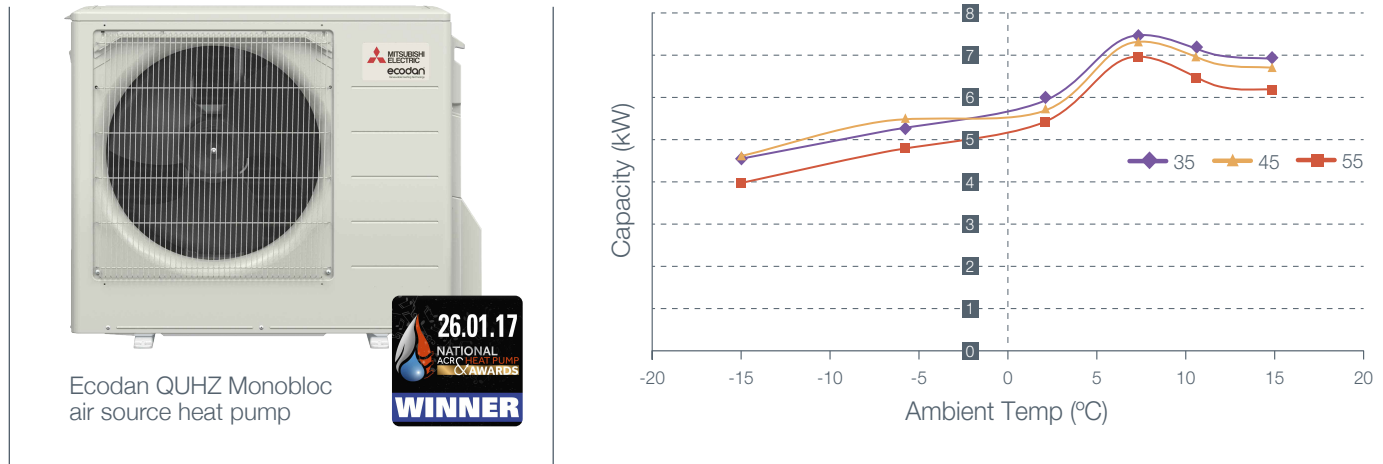
First Floor Heat Losses	Area (m ²)	Design set-point (°C)	Heat Loss (W)
Bedroom 1	17	18	343
En Suite	6	22	119
Bedroom 2	19	18	382
Bedroom 3	13	18	260
Bathroom	7	22	132
Landing	11	18	216
Total	73		1452

Total Dwelling Heat Loss @ -3°C = 3.64kW

Ecodan QUHZ Application Considerations

The Ecodan QUHZ capacity at the design ambient temperature is 5.2kW and is greater than the building heat loss of 3.64kW making the QUHZ suitable for the dwelling.

Capacity



Heating System

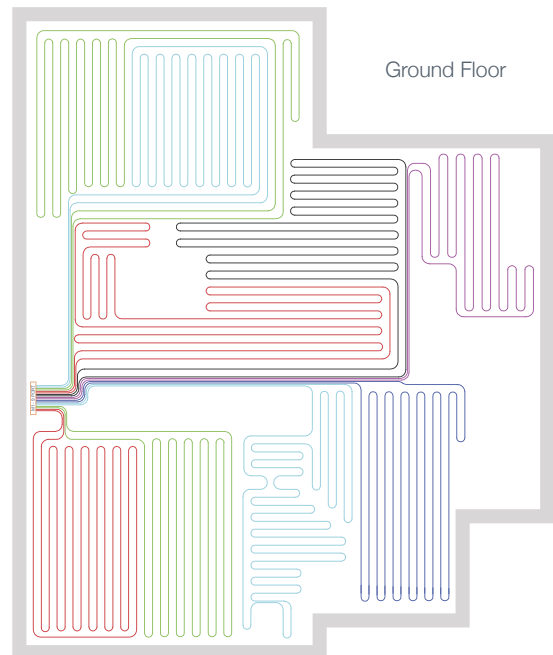
The design required underfloor heating installed throughout the ground floor and radiators on the first floor. Travertine tile floor covering was used throughout the ground floor.

The QUHZ uses a high delta T to maximise its efficiency. Therefore space heating design parameters were selected to maximise the performance efficiency of the Ecodan QUHZ.

- Peak design flow temperature: 50°C
- System flow rate: 4 l/min
- Design delta T for this system is 13.1

Underfloor heating details:

- 6mm piping
- 150mm centres
- Meander pattern



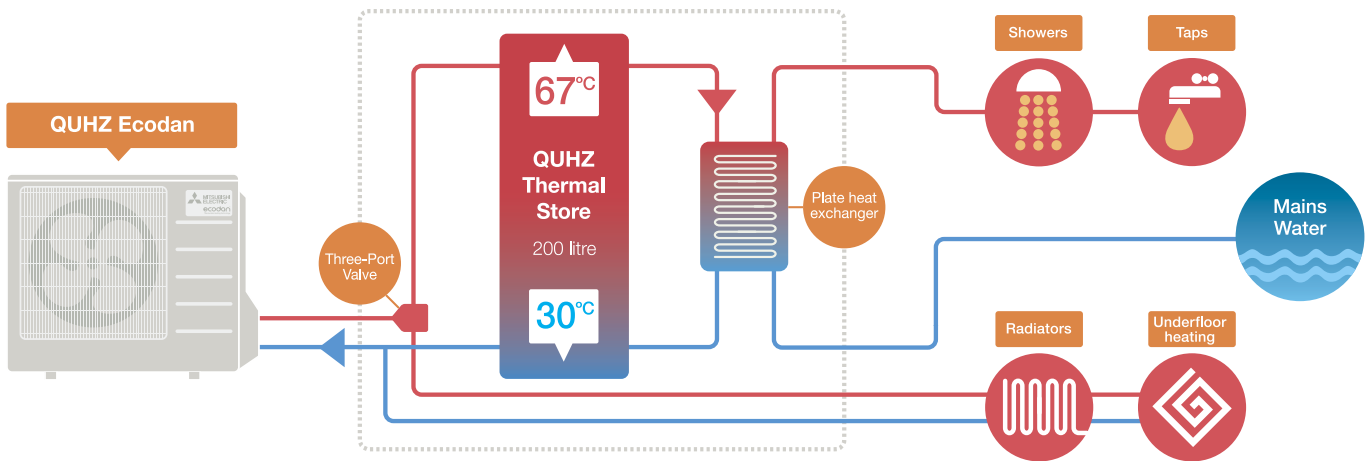
Applying these parameters achieves the correct heat output of 25 W/m² for this project's heating design.

Radiator Schedule:

Room	Heat Loss (W)	Height (mm)	Width (mm)	Type (mm)	Correction Factor Applied
Bedroom 1	343	600	800	K2	0.404
En Suite	119	1211	500	TR	0.322
Bedroom 2	382	600	800	K2	0.404
Bedroom 3	260	600	500	K2	0.404
Bathroom	132	1211	500	TR	0.322
Landing	216	600	500	K2	0.404

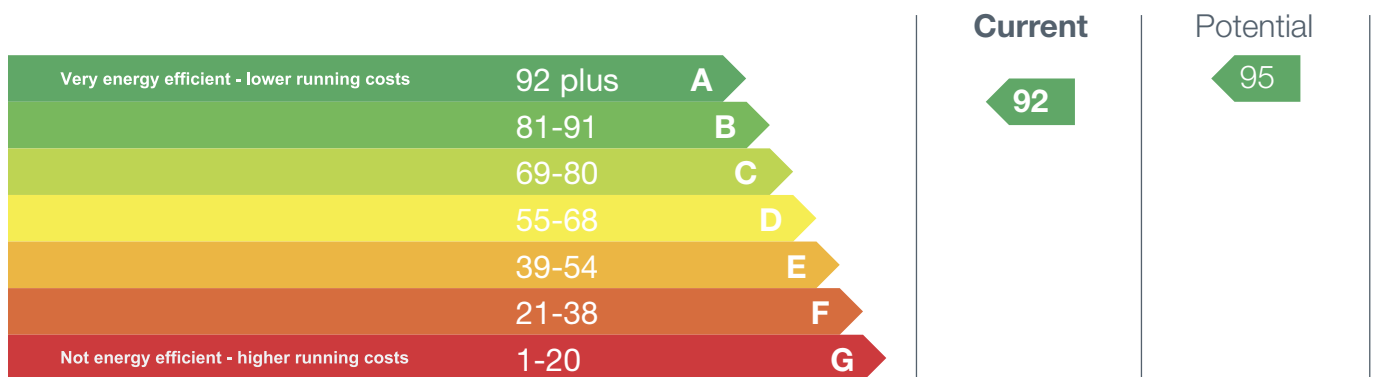
Ecodan QUHZ and Thermal Store Operational Schematic - Domestic Hot Water

The Ecodan QUHZ outdoor unit delivers water up to 70°C to a packaged 200 litre thermal store. From this, mains water is instantaneously heated directly up to 65°C via Mitsubishi Electric's unique plate heat exchanger. This provides the equivalent hot water of a 250l cylinder.



Energy Efficiency Rating

The application of Ecodan QUHZ has helped this home achieve an **A rating** (92/100) on the energy performance certificate (EPC). The low flow temperatures supplied to the underfloor system and radiators together with hot water on demand from the thermal store will also ensure high efficiency and low running costs.



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Note: The fuse rating is for guidance only. Please refer to the relevant databook for detailed specification. It is the responsibility of a qualified electrician/electrical engineer to select the correct cable size and fuse rating based on current regulation and site specific conditions. Mitsubishi Electric's air conditioning and heat pump systems contain fluorinated greenhouse gases R410A, R407C and R134a.

Effective as of January 2017