

Technical Considerations

The information below will help you understand some of the considerations made in the design of your system and how you should use the system to get the best performance:

Building Specifications: Our system designs are based on the building and insulation information available to us at the time. It is crucial that any significant changes to the building specifications or insulation are promptly communicated to us. This allows us to update the design accordingly and ensure that these changes are accurately taken into account.

Getting the most out of your system: The design of the heating system is based on the outdoor air temperature specified in the design parameters above, this temperature is extracted from local weather stations and is the 2.5% design figure for this weather station, this means that on average the outdoor air temperature will only be lower than this for 2.5% of the hours each year. Under these conditions, the system is designed to achieve at least 21°C in the living areas and 17°C in bedrooms and hallways. However, if any of the design criteria are compromised, supplementary heating may be required at times.

Increased Load and Window Coverings: Multilevel homes, those with large areas of glazing, complicated shapes, or rooms with more than two external walls, may require more heat than others. We account for these factors in the design, but longer warm-up times and adjustments to system balancing may be necessary to achieve desired comfort levels. Avoid using positive pressure ventilation systems like DVS or HRV as they can force heat out of the house, increasing running costs. Instead, opt for balanced heat recovery type ventilation systems. Using curtains is advised for energy efficiency and maximum comfort, especially near windows, as even high-quality double glazing can still experience temperature differences. Note that privacy roller blinds provide little thermal insulation value.

Pool Heating: The proposed central heating system for your home is also designed to provide seasonal heating for your pool. After the heating season ends and the outside air temperatures rise, you can utilize your heating system to warm the pool. The pool heating design assumes that the pool will be covered when not in use, allowing the heating system to raise the pool temperature to a comfortable range of 25-28°C. However, please note that when the pool is in use and uncovered, heat loss may exceed the available heat from the system. As a result, during prolonged periods of pool usage, a drop in temperature may be noticeable. Nonetheless, once the pool is covered again, the temperature will increase. It is important to mention that the initial warm-up of the pool may take a few days. While it is possible to design a system for faster pool heating, it would require a significantly larger heat source, which could be inefficient in maintaining the pool temperature or oversized for house heating purposes.

Radiator Heating Considerations:

Running the system: Radiator central heating systems offer quick response times to heating demands. To improve system efficiency and comfort levels, we recommend only setting back the temperature to a lower point when comfort levels are not required. When a heat pump powers the radiator system, the set back temperature should be only 3-4°C lower than the comfort temperature.

Underfloor Heating Considerations:

Running the System: To achieve optimal living temperatures with reasonable running costs, we recommend running the in-slab underfloor heating system constantly throughout the heating season. The thermal mass of the floor retains heat more efficiently when continuously heated. At the start of each season, the floor may take approximately 8 hours to reach its ideal temperature and consume more energy compared to maintaining a consistent temperature. We suggest leaving the system operating throughout the winter, and if needed, using controls to manage temperature variations within a maximum range of 2°C between corresponding time schedules.

Insulation and Thermal Bridging: Insulation beneath the floor slab is essential to minimize downward heat loss. The required insulation level depends on the climate region as per building code regulations. Slab and insulations suppliers have developed solutions to achieve the necessary insulation levels for installing underfloor heating. To mitigate thermal bridging

issues, insulate the perimeter of the foundation and use thermal breaks to isolate the heated slab from patios, paths, and unheated areas, reducing heat loss.

Floor Coverings: Underfloor heating systems radiate heat from the concrete slab into the room. When selecting floor coverings, consider their impact on heat emission. Thick or highly insulating underlays should be avoided, while floor coverings with a maximum resistance of R 0.15 are recommended. Hard floor coverings like polished concrete, tiles, vinyl, and engineered timber laminates are particularly suitable for spaces with higher heat loads.

System balancing: Underfloor heating systems feature separate loops for each room. When our engineers complete the system design, they calculate and provide ideal flow rates for each loop to be set by your installer during commissioning. As your needs may change over time, the flow rates can be adjusted to accommodate these changes, allowing you to perfectly tailor the system to your requirements. In most systems, it is possible to close a certain number of loops without affecting the correct operation of the system. However, it is important to note that closing half of the loops, for example, would only result in a 20-30% reduction in running costs, as heat provided to the open areas will still spill over to the closed areas.

Radiant Cooling Considerations:

Radiant Cooling: Radiant cooling systems provide cooling directly to the occupants rather than solely cooling the air in the room. The typical cooling range is 25-27°C, which achieves comfort levels comparable to 23-24°C with conventional cooling systems. Similar to underfloor heating, it is recommended to run the radiant cooling system throughout the warmer months, considering the set point on the thermostat as a starting point, as internal temperatures may rise above that while the system is operating. Familiarize yourself with our technical articles on radiant cooling to ensure it suits your home's needs.

Domestic Hot Water Heating Considerations:

Heat Pump – Hot Water Heating: The proposed central heating system for your home is designed to provide both space heating and domestic hot water. While the heat pump primarily handles hot water heating, building codes require a daily or weekly boost to reach a temperature of 60°C in the stored hot water. To achieve this, an electrical element will be installed and connected to a 24hr or 7-day time clock. You can program the element to boost the cylinder for 1 hour a day or 2 hours a week before any periods of domestic hot water usage, ensuring that the water is adequately heated.

Boiler – Hot Water Heating: The proposed central heating system for your home is designed to provide space heating and domestic hot water. The boiler has the capability to efficiently heat your hot water to 60-65°C. To optimize energy usage, it is recommended to schedule the heating cycles to coincide with periods of hot water usage, such as in the morning from 7 to 8 am and in the evening from 7 to 8 pm. This approach ensures that the boiler operates specifically to meet your hot water needs and minimizes any unnecessary reheating of the cylinder to recover heat losses.

By keeping these important considerations in mind during the design phase, you can ensure the optimal performance, efficiency, and comfort of your heating system in your home. Our website is full of technical documents and articles that cover the above points in more detail and our team is available to talk through any concerns and questions that you may have.