

Piping Towel Rails from a Heat Pump DHW Circuit

In hydronic heating and cooling systems, providing heat to towel rails can be a challenge when the system is also intended to provide cooling. By piping the towel rails off the same circuit as the domestic hot water (DHW) cylinder, towel rails can be heated even when the system is operating in cooling mode, without relying solely on the towel rails electric element. This method offers a more energy-efficient solution for year-round towel rail heating while also simplifying the system controls and installation.

Key Advantages

1. **Year-Round Heating:** By connecting the towel rails to the DHW circuit, they will receive heat whenever the domestic hot water system is active. This ensures that the towel rails remain functional during the summer, even when the system is in cooling mode.
2. **Simplified Piping:** When also providing cooling, this method will remove the need for a motorised valve to cut flow to the towel rail.

Piping Set-Up

1. **3-Port Valve Integration:** The towel rails should be piped into the DHW circuit of the 3-port valve (see schematic below). This valve directs hot water from the heat pump to either the DHW cylinder or the space heating/cooling system.
2. **Heat Pump Configuration:** Ensure that the heat pump is programmed to prioritize the DHW circuit whenever there is a demand for hot water. The towel rails will then follow the DHW heating schedule and receive heat when the cylinder is heating.

3. **Thermostatic Valves:** Install thermostatic valves on the towel rails to prevent them from overheating when the DHW circuit is active, providing a balanced temperature.

Key Disadvantages

1. **No Independent Control of Towel Rails:** Since the towel rails are tied to the DHW heating cycle, it is not possible to control them independently with a separate time clock or thermostat. The towel rails will only heat when the DHW cylinder is being heated. But generally, this means that towel rails are heated during and after the use of showers or baths.
2. **Limited Scheduling Flexibility:** While previously proposed setups may have allowed scheduling of towel rails independently through a time clock, this solution means they will only operate when the DHW heating is scheduled/required.

Workaround for Scheduling

If independent scheduling is critical, an electric element could still be incorporated into the towel rails. This would allow for manual or scheduled operation of the towel rails using an electrical control system, separate from the DHW cycle. The electric element can act as a backup during times when the towel rails need to be heated outside the DHW heating window.

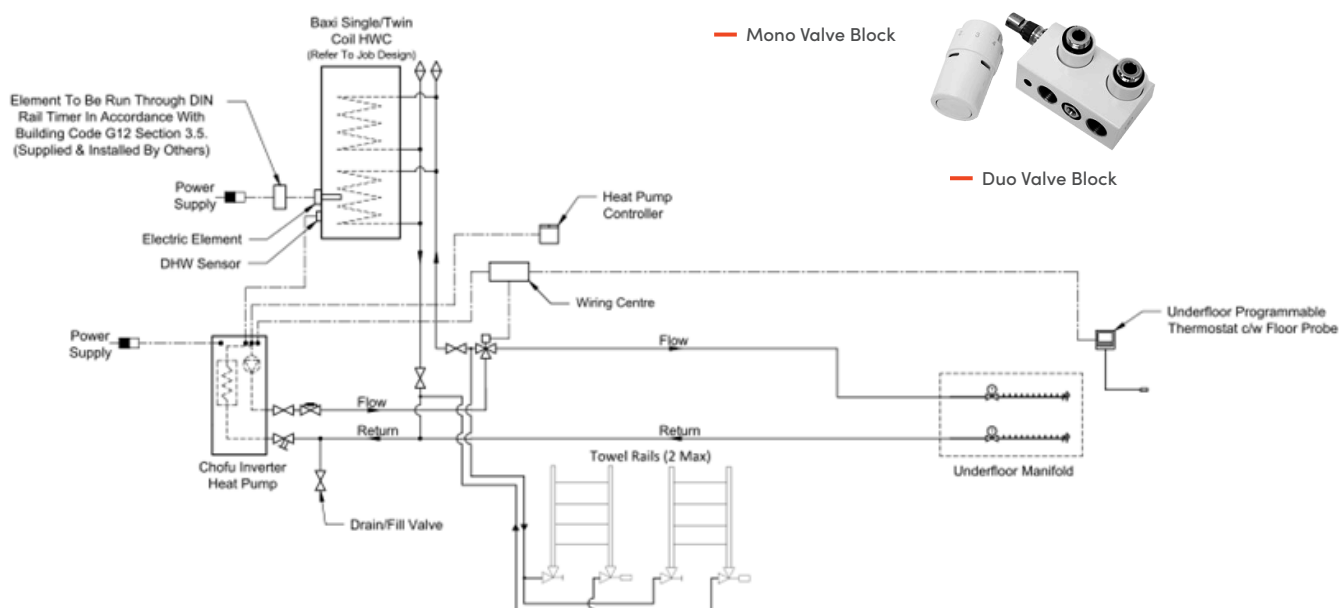
Key Considerations

- 1. Quantity of Towel Rails:** No more than 1-2 towel rails (<1000Watts of output) should be put on a DHW circuit to ensure we are not allowing "DHW" to heat for an extended period preventing the space heating/cooling system from operating.
- 2. User Preferences:** The lack of independent control should be communicated to the client, ensuring they are comfortable with the towel rails operating in sync with the DHW system.
- 3. System Efficiency:** Piping the towel rails into the DHW circuit can be an efficient use of the hydronic system, reducing reliance on electric elements. However, this does not allow forced direct electrical use in times of solar power production or low tariff periods.

Schematic & Valves

Below is a schematic showing how two towel rails can be connected into a typical heat pump powered underfloor heating and cooling system that includes DHW heating.

The detail shown below is an example and the valve requirements and options will vary by towel rail, when connecting towel rails into a system this way it is recommended to use the Mono or Duo valve blocks and an electric element to allow easy connection of a back-up heat source for the towel rails.



Recommendations

When adding towel rails to the DHW heating circuit of a heat pump heating system the following recommendations should be considered:

1. A maximum of two towel rails with a combined heating output of 1000W. For heating requirements greater than this or more than 2 towel rails CHNZ's engineering team can review and approve this.
2. Feed pipes to the towel rails should be 16mm OD to each individual towel rail and 20mm OD when joined, with a single flow and return connection into the HWC Heating Pipes. Total pipe distance should not exceed 40m (flow and return).
3. Towel rail feed pipes are recommended to be run insulated even when run within the thermal envelope to reduce heat up time and heat losses.
4. Towel rail lockshield/regulating valves should be set to provide an appropriate hydraulic resistance to balance the flow through the towel rails and HWC coil/s – if a suitable setting is not known please contact CHNZ's engineering team for a recommended valve setting.

