

TECHNICAL BULLETIN

PRODUCT: HOT WATER DISTRIBUTION SYSTEMS

DHW SECONDARY CIRCULATION

Domestic Hot Water systems with extended pipe runs can become an inconvenience and lead to excessive water usage. At the design stage consideration should be given to the incorporation of a secondary circulation arrangement.

Secondary circulation will incorporate an additional return pipe after the furthest draw off point from the cylinder, smaller than the Domestic Hot Water supply pipe. In the return pipe a bronze circulation pump will be situated near to the Hot Water storage cylinder with a non return valve to ensure flow is only allowed in the correct direction. The return pipe will connect to the storage cylinder either in a dedicated tapping, typically situated a 1/3 of the way down from the top of the cylinder, or via an Essex flange connection made at a similar point.

Domestic Hot Water pipe work must be insulated to comply with BS5546 – 2000 section 5.2.5 which generally means that domestic sized pipe work of 15 mm and 22 mm would have to be insulated to BS6700 if the total pipe run exceeds 12 m in length. In most practical situations this will mean that the pipe work will need to be insulated to reduce standby losses.

When designing secondary circulation pipe runs, the length of pipe to the draw off should be kept as short as is practicable. The supply pipe sizes should be kept under 0.5 m/s (metres per second) for copper pipes. A flow regulating valve in the return can be useful for final commissioning to ensure the design flow rate is achieved. A flow and return differential of 5°C should be used for design purposes.

Consideration should be given to the control of the pump to reduce unnecessary energy losses both in heat and electrical power. Some controllers are capable of bringing on the pump a certain number of times per hour to ensure the comfort level is maintained whilst minimising energy use. Alternatives include time controlled systems that activate during hot water demand periods or can be switched by P.I.R. (personal infra red) detectors in rooms where hot water is used (bathrooms, kitchens etc.).

At the design stage it is crucial to consider the role that a secondary circulation will play in any legionella protection plan. Control may be necessary during thermal disinfection programmes. Nursing homes and other vulnerable high risk situations will need to be carefully considered using guidance from HSE ACOP L8.

KEY:

- 1: HWS cold feed valve
- 2: Open Vent
- 3: Cylinder return valve or Essex flange
- 4: Isolating valve
- 5: Flow regulating valve
- 6: Non return valve
- 7: Bronze hot water circulating pump
- 8: Isolating valve
- 9: All pipework insulated (supply and return)
- H: Hot water outlet

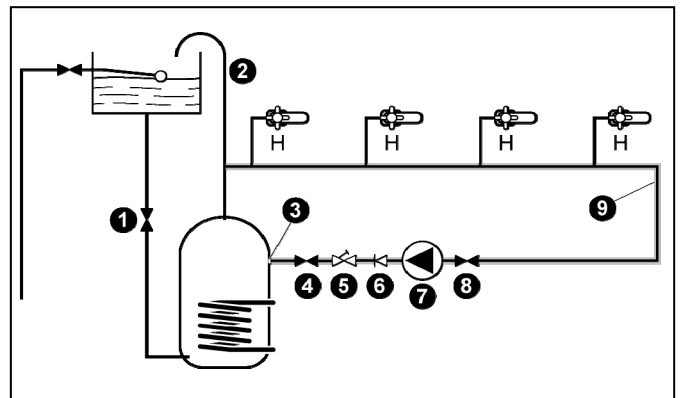


Fig 1: Example of secondary return on a vented hot water system