Boiler Drains

Modern central heating systems operate as closed circuits, circulating heated water from the heat source through system emitters to warm the home. As the water temperature increases, the water expands. An appropriately sized expansion vessel is used to accommodate this normal thermal expansion and maintain system pressure within a safe operating range.

To protect the system against excessive pressure—such as in the event of a component fault—a pressure relief valve (PRV) is incorporated within the boiler and, in some cases, elsewhere in the system. If activated, the PRV discharges water that may be at elevated temperatures, and this discharge must be safely conveyed away from the appliance and expelled to a suitable external location. Properly designed and installed drainage provision is therefore essential.

High efficiency condensing boilers also generate condensate as part of their operation. By extracting additional heat from the flue gases, water vapour is condensed into liquid. This condensate is mildly acidic (typically comparable to the acidity of tomato or lemon juice) and must be discharged to a suitable drainage system to ensure both safety and compliance with installation standards.

This document provides guidance on appropriate materials, installation methods, and best practices for designing and installing drainage systems for modern central heating boilers.

Discharge Location Requirements

PRV and condensate drains must both discharge outside the building envelope, but have different requirements and considerations.

- **PRV:**
  - Must discharge to an external location such as a garden bed or purpose-built soak pit, in a similar manner to a hot water cylinder TPR drain.
  - Must pass through a tundish or trap with a visible air gap, enabling clear observation of any PRV operation.
  - Must not discharge onto or into surfaces or materials that could be damaged by water that may reach temperatures up to 90°C.
  - Must be arranged to prevent scalding risk to occupants or public areas.

- **Condensate:**
  - Must be neutralised before being discharged into stormwater or gully trap drains.
  - If discharged onto garden or paved areas, there must be a neutralising soak pit containing suitable media such as limestone chip.

- Must not discharge directly onto paved, metal, or decorative surfaces to avoid corrosion or discolouration.
- Must be insulated or frost-protected when run outside the building's thermal envelope in regions where temperatures may drop below 0°C.

Drain Type and Material Requirements

The properties of the discharged fluids determine the required pipe materials.

- **PRV:**
  - PRV discharge water may exceed 90°C.
  - Pipework must therefore be copper or another suitably rated high-temperature material.

- **Un-neutralised Condensate:**
  - Condensate typically has a pH of 3–4, requiring corrosion-resistant materials.
  - Use PVC or other plastics rated for acidic condensate.
  - Metal pipework must not be used upstream of the neutraliser.

- **Neutralised Condensate:**
  - Once passed through a suitable neutraliser, condensate may be discharged into copper or metal drains, which may be necessary for retrofit installations where only existing metal drain routes are available.
  - The pH level of the discharge must be tested during each service.
  - Neutraliser media must be replaced as required to prevent corrosion of the downstream metal pipes.

- **Combined PRV & Condensate Drains:**
  - If required, PRV discharge and un-neutralised condensate may be run in a common drain, provided that;
    - The common section is made from high-temperature PVC or CPVC capable of handling both heat and mild acidity.
    - A visible air gap is maintained on the PRV connection to the combined drain.

Drains must maintain natural fall from the appliance to the external drain location.