Condensing boiler

Concept

A condensing boiler heats water at a low temperature. Equipped with a more efficient heat exchanger than that of a traditional boiler, it can achieve superior performance that could be as high as 10% when used appropriately. To achieve this, the water supply to the boiler must be at a low temperature: this is key to the appliance's performance. The graph on the right shows combustion efficiency: the colder the water, the more efficient the combustion.

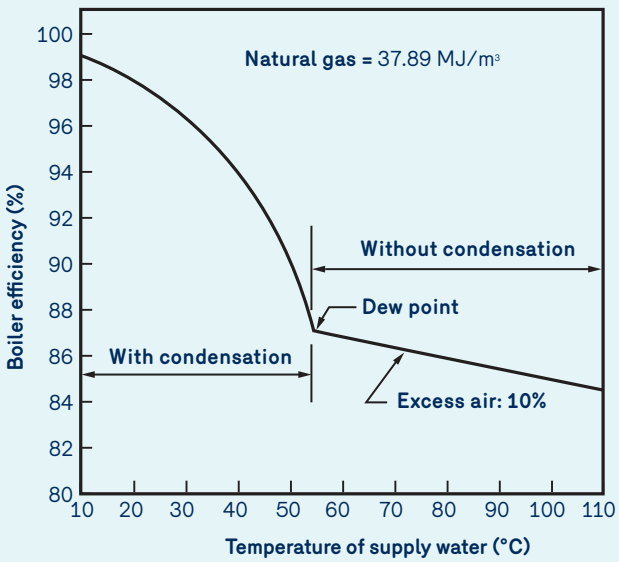
Higher efficiency values are obtained when the dew point is reached. The first droplets appear at about 55°C (131°F). Below that temperature, efficiency increases significantly.

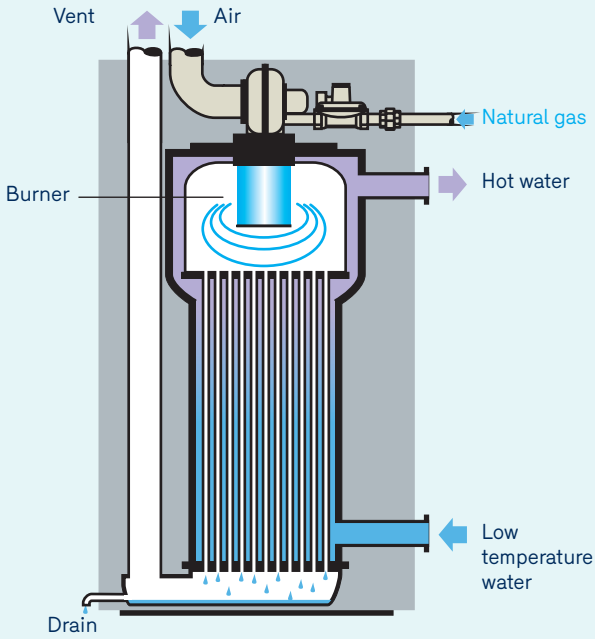
The name "condensing boiler" is explained by the fact that, once chilled, the steam from the combustion products changes from a vapour to a liquid. The surface of the heat exchanger must be at a temperature of about 55°C (131°F) or lower in order to facilitate this change. The steam contains a significant quantity of energy, about 1,000 Btu/lb. of water, which is transferred to heating water.

Applications

- Buildings with a hot-water heating system – low temperature: 55°C (131°F) or below.
- Existing buildings with a hot-water heating system where the heat can be transferred before returning to the boiler (e.g. heating a fresh air compensator or a domestic water system).
- Reheat the mitigation water system by using heat pumps for heating and air-conditioning.
- High energy-efficient buildings that wish to receive Leadership in Energy and Environmental Design (LEED) certification.

Effect of supply water temperature on efficiency of condensing boilers





Advantages

- With operating conditions favourable to condensation, combustion efficiency can be improved by 10% or more compared with a traditional boiler.
- The ideal solution for projects where energy performance is sought, such as LEED or Novoclimat projects.
  - The use of a condensing boiler compares advantageously with the reference building, while an electrical system does not.
- The appliance is more compact, making it fit easily in a mechanical room.

Energy Efficiency Financial Assistance*

Financial assistance from $900 up to $25,000, depending on the capacity and make of appliance (for the commercial market), and $900 per boiler (for the residential market).

Advice

- The condensing boiler must be used under specific operating conditions in order to optimize its expected performance and ensure its smooth functioning.
- The water flow rate through the boiler is an important criterion. Please refer to the manufacturer's specifications.
- Regular maintenance is needed to ensure the optimal operation of the condensing boiler.
- Engage the services of a Énergir Authorized Partner to carry out the installation.

List of manufacturers

Here is a non-exhaustive list of manufacturers who are registered with and subsidized by Énergir's Energy Efficiency Grant. This list may be revised and modified when necessary. Please check its accuracy on our Web site, energir.com.

- Aerco International
- Ajax
- Buderus
- Camus Hydronics
- Cleaver Brooks
- Crown Boiler Co.
- De Dietrich Fulton
- Fulton
- Gasmaster Industries
- Hamilton Engineering
- Heat Transfer Products
- Laars Heating Systems
- Lochinvar
- NTI
- NY Thermal
- Patterson-Kelley
- PVI Riverside Hydronic
- Raypack
- RBI
- Thermal Solutions
- Triangle Tube
- Viessmann
- Weil-McLain

Installation standards

- Natural Gas and Propane Installation Code CAN/CSA B149.1 in force and the manufacturer's Operating Manual.
- The boiler's venting system is an integral part of its approval and must be installed according to the manufacturer's instructions in order to maintain its certification.
- Also, the condensates are acidic and need to be treated. The location of the vent needs to be well-chosen.
- Check that the water temperature control system, linked to an external temperature sensor, is operational in order to optimize the performance of condensing boilers used for heating.

* Certain conditions apply.

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