

Control technology
Weather compensated controls

Find out how to save an amazing 15% extra on fuel bills



...with advanced boiler controls from Viessmann

Heating systems ◀
Industrial systems
Refrigeration systems

Weather compensation

With ever increasing fuel bills and the need to be as eco-friendly as possible, it's important that we all look for ways to save fuel and carbon emissions - and money!

All gas boilers now have to be condensing boilers and this represents a huge step forward in environmentally friendly heating, with fuel savings of up to 35% compared to conventional boilers.

But there is a way to save even more - up to 15% in fact, with just a simple outdoor sensor and some very clever Weather Compensation controls, available with the Vitodens range of condensing boilers.

For a relatively small investment you'll not only save up to 15% more fuel each year but you'll also enjoy an incredibly comfortable home - with a pleasant indoor temperature - whatever the weather.

Heating - the basics

Our homes need heating, to replace heat lost through the walls etc. The colder it is outside, the more heat is lost and the more we have to heat the building, to replace that heat, especially in the winter when the heat loss is at its highest level.

This basic explanation is fundamental to understanding how an outdoor weather sensor can help to heat your home in a more efficient and cost-effective way.

Weather compensation controls work by ensuring that the boiler burns the exact amount of fuel required to match the heat lost from the building. The house will always be warm (at the desired temperature) and will never be too hot or too cold.

Weather compensation significantly improves efficiency under partial load conditions and is especially relevant for the UK climate, as for two thirds of the year the boiler will provide only a fraction of its maximum heat load, which means the boiler temperature is reduced for the majority of the year, while still maintaining a constant room temperature of 20°C. Only around 15% of the homes total heat energy usage is consumed during winter temperatures between -3 to -10°C.



Conventional controls

Traditional heating systems have a room thermostat indoors and this is the sequence that follows a drop in temperature.

1. Outside temperature drops



2. More heat is lost through the walls & windows



3. Rooms get colder - which is detected by the room thermostat



4. Thermostat 'tells' the boiler to come on/work harder



5. Rooms get warmer again

In the above example, it isn't until stage 4 that the boiler gets any 'feedback' and is able to respond to changing conditions. The chances are that at this stage, the householder will be feeling the cold and will turn the thermostat up even further - wasting even more fuel.

If the outside temperature rises, the boiler will not respond until the rooms have become uncomfortably warm - so in addition to adjusting the thermostat, there'll probably be the temptation to open some windows, releasing more heat and wasting more energy.

With a weather compensation system, the boiler is able to respond at stage 1 - see opposite.

How does it work?

A small temperature sensor is located on the outside of the building, on a south facing wall. This is wired to the internal controls of the boiler and information about the outside temperature is sent to the boiler controller constantly.

When the temperature changes outside the boiler responds and starts to increase or decrease the radiator temperature to compensate. This pro-active mechanism means that people inside the building won't even notice that the temperature has changed outside.

For example, when the outside temperature drops at night, more heat is lost through the walls of the building. Because the outdoor sensor detects the fall as soon as it happens, the boiler is able to raise the radiator temperature and keep the inside temperature stable. With a conventional system, the temperature is dependent on a room thermostat, which will only take effect after the inside of the building has become too hot or too cold.

In summary, weather compensation controls enable the boiler to respond to outside temperature changes and adjust the radiator output, to maintain a constant temperature indoors.

The boiler flow diagram below helps to demonstrate how this compares to a heating system without weather compensation - where the boiler runs very hot then very cold as it constantly 'plays catch up' to achieve the desired room temperature.

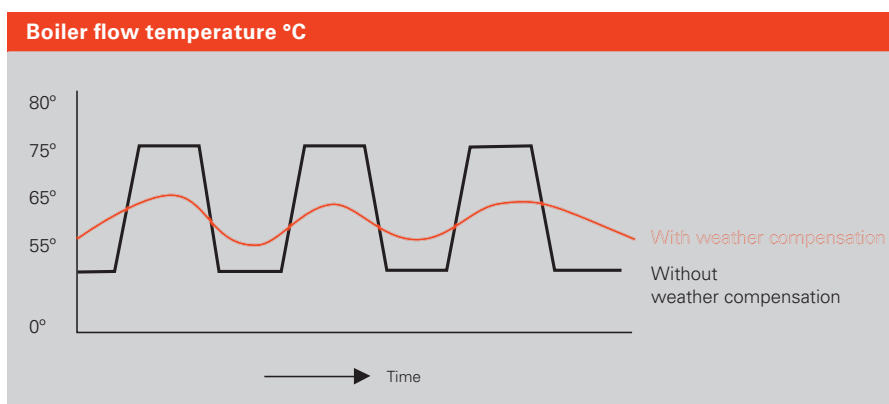
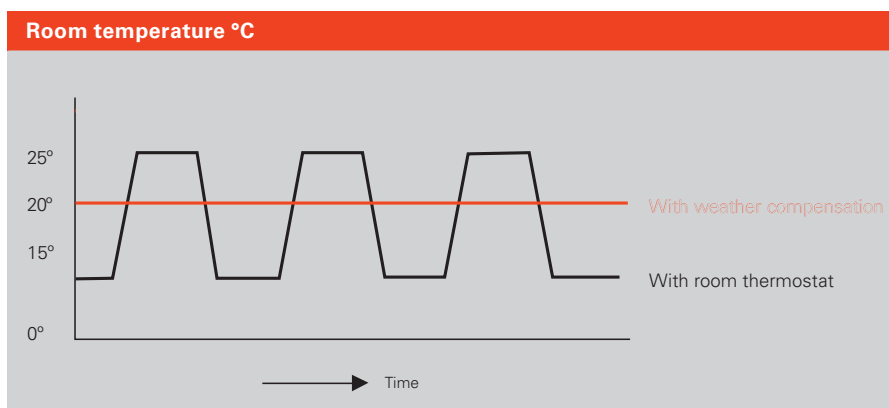
Maximising the condensing effect

Condensing boilers have dramatically increased the efficiency of home heating systems, by recovering latent heat in the flue gases. For a condensing boiler to achieve the high levels of efficiency it is capable of it needs to condense for as long as possible. An outdoor weather sensor can help the boiler operate at lower temperatures, meaning it can condense for longer.

How does it help the boiler to condense longer?

For a condensing boiler to actually get the water vapour in the flue gas to condense, the return water temperature needs to be at or below 57°C (dew point). Without weather sensitive controls this may not be the case, with most boilers operating with a flow temperature of around 80°C. This results in a return temperature of around 70°C - too high for condensation to occur.

Advanced controls, with an outdoor weather sensor enable the boiler to make constant, small adjustments to the flow temperature, ensuring that the boiler runs as hot as it needs to - but no hotter. By achieving a flow temperature a few degrees lower, the return temperature is lower, and the boiler condenses for longer, operating more efficiently and thus saving fuel.

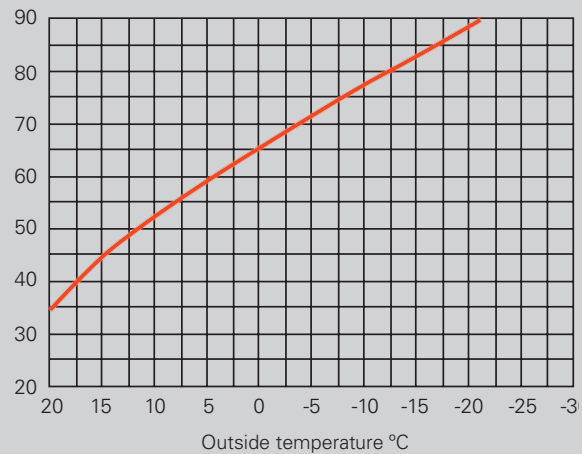


Standard weather compensation controls (Vitodens 100/050 range only)

The curve demonstrates how the boiler temperature adjusts in response to changes in the outside temperature.

As the heating curve shows, if the outside temperature is close to freezing the boiler will run at a flow temperature of around 65°C, which ensures a return temperature enabling the boiler to condense. If the outside temperature increases, the set flow temperature reduces accordingly, to maintain comfort and increase fuel savings. In this case the slope and shape of the curve are fixed, but it is possible to position (or shift) the heating curve so that the boiler achieves and maintains the preferred temperature of the householder. Savings of up to 12% can be achieved.

Boiler flow temperature °C



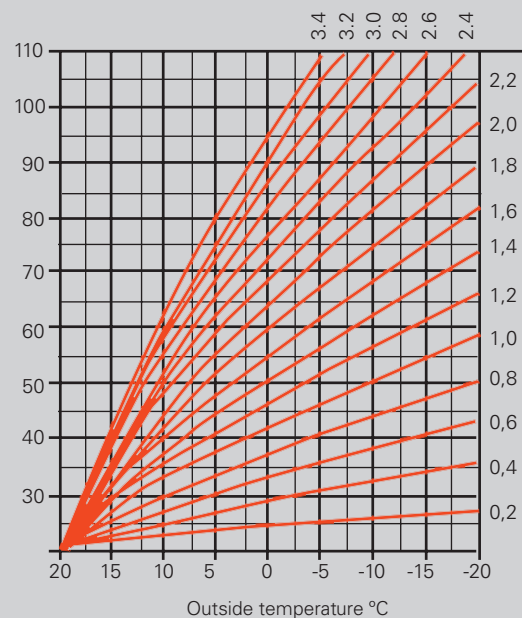
Advanced weather compensation controls (Vitodens 200 range only)

This type of boiler control is very sophisticated in that the slope of the heating curve can be adjusted or 'fine tuned' to suit not only the householder, but also the type of building construction.

For example a very well insulated house will lose far less heat than an older house and will not require the boiler to work so hard when the outside temperature drops - so a flatter heating curve will achieve the desired room temperature for such a building. A badly insulated house will experience high heat loss in the winter and require a steeper heating curve to compensate.

Once again the position of the heating curve is set according to the householder's heat requirement in terms of personal comfort.

Boiler flow temperature °C



Further benefits are:

- Night set-back option
- Built-in 7-day programmer
- Built-in pump logic for optimised pump over-run to reduce power consumption
- Morning booster function, it lifts the flow temperature by 20% first thing in the morning to heat the house faster
- Savings of up to 15% can be achieved

What does it mean to the householder?

Lower fuel bills - save up to 15% of your annual fuel bill - that's on top of the savings you'll make by changing a conventional boiler for a condensing boiler.

A comfortable home - a constant temperature is maintained inside, despite the changing weather.

You won't even notice the changes - because the system is pro-active, rather than reactive, you won't notice the subtle temperature changes. You certainly won't be feeling the cold and don't need to worry about adjusting a room thermostat. An even quieter boiler - if you've already got a Viessmann boiler, you'll know that they operate incredibly quietly. With weather compensation the boiler should fire so infrequently that for the first few months you'll probably keep checking it's still on!

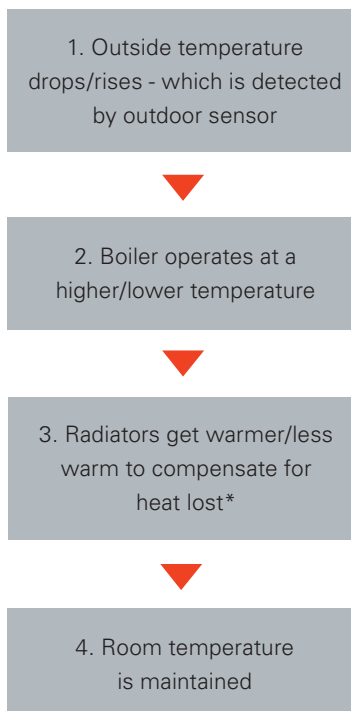
Cooler radiators - a good sign that the weather compensation is working well, is that the radiators will feel warm, but won't get very hot, then cool. This is because the small adjustments mean that a steady temperature is maintained, with few fluctuations.

Piping hot water - even though the radiator temperature is kept low, you have the reassurance that, at the same time, the temperature of water in the cylinder (if you have one) is maintained, for piping hot water when required.



Weather compensation controls

With weather compensation the sequence of events changes considerably:



*The small, constant adjustments mean that the radiators should feel warm, rather than hot and then cold. In this example, as soon as the outside temperature falls, the boiler is able to respond instantly because the sensor is continually sending information to the boiler.

If the outside temperature rises, the boiler will automatically run the radiators at a lower temperature, to maintain the correct level. The householder will be unaware of these small constant adjustments and does not have to touch any controls or thermostats to enjoy a constant, comfortable temperature.

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Weather sensitive controls from Viessmann

Weather sensitive controls are available on most Vitodens domestic boilers - either as an optional extra, or already built in. There are 2 versions:

Standard weather compensation controls

Vitodens 111/100/050-W System and Combi models are already fitted with standard weather sensitive controls and just need connecting to an outdoor sensor, to take advantage of significant fuel savings. A kit is available for the Vitodens 100-W Compact.

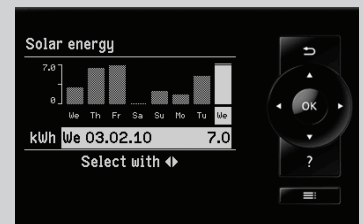
Advanced weather compensation control - the Vitotronic 200

This advanced control is available as an option on the purchase of the Vitodens 200-W or Vitodens 222-F boilers. It is fitted as standard in the Vitodens 242-F solar DHW storage boiler.

Vitotronic 200 controls are highly responsive, for increased efficiency and maximum savings. There are also a number of added features for comfort and convenience, including a Party function, which extends the heating period to keep the house warmer without having to alter the settings. A Holiday setting enables you to key in your holiday dates and while you're away the boiler will run a frost protection program instead of your comfort heating settings. It will then warm up the house before you return. The Economy setting is a quick and easy way to turn the temperature down if you're leaving the house for a few hours.

Additional features include:

- Easy installation, commissioning and maintenance, with integrated diagnostics
- Service interval display
- Digital time switch for selecting daily or weekly programs
- Automatic summer/winter change over
- Integral control unit for 3 heating circuits (2 mixed, 1 unmixed) and 1 DHW circuit
- Integral remote monitoring & operation interfaces



The graphic display of the new Vitotronic control unit can also display the solar yield, for example

For installers and developers

Building regulations (SAP) add 3% to the energy calculation if weather compensation is used.

Your trade partner:

KE KELIT Climate Control are exclusive distributors for Viessmann in New Zealand



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