



HOTPLATES & HOTPLATE / STIRRERS

WHY AM I HAVING TROUBLE BOILING WATER ON A HOT PLATE ?

IEC Hot Plates are available with either 'Simmerstat' or 'Thermostat' temperature control. It is sometimes confusing as to which style should be chosen. This sheet is to try to explain the difference and to make the choice more correct.

INFORMATION ON 'SIMMERSTAT' AND 'THERMOSTAT' MODELS:

A 'Thermostat' control cycles the heating element to hold a specific temperature UP TO 320°C and only enough heat is fed to the plate to maintain this set temperature. This type of plate control is excellent for lower temperature work or for melting solids at specific temperatures. It is not ideal for boiling water or other applications where maximum heating effort and highest plate temperature is required.

A 'Simmerstat' control (or energy regulator) adjusts the heat from zero to maximum on a scale of 0 to 10. When set to '5', the heater is on for 50% of the time and off for 50% of the time. When set to '10', the heater is on 100% of the time and it reaches its maximum temperature of around 450°C.

This temperature is much higher than can be obtained with the Thermostat control and, for bringing water to the boil in a vessel (beaker or similar), the plate needs to achieve the highest temperature, as explained below.....

EXPLANATION:: When a beaker of liquid is heated on a hot plate, several things should be considered:

- 1) Most of the available heating energy is lost from the plate area that is not covered by the beaker.
- 2) The beaker normally has a small air space that is captive between the hot plate and the glass of the beaker and heat must pass through both this insulating pocket and the glass before it can heat the liquid.
- 3) As water is approaching a boil, steam is produced which cools the surface of the water. This loss of heat must be made up by further heat from the plate.
- 4) As water approaches a boil, there is considerable heat loss also from the walls of the beaker to the surrounding atmosphere.

In summary, the 'Simmerstat' control permits the maximum power of the hot plate to be used and provides a higher plate temperature. It is the better choice for general laboratory applications and particularly for bringing fluids to a simmer or a boil.