The Combustion Analyzer

The combustion analyzer allows precise measurement of the operation of fossil fuel furnaces or water heaters. This instrument measures the concentration of oxygen and carbon monoxide, together with the flue gas temperature and the air inlet temperature.

From the concentration of oxygen and the type of fuel the combustion analyzer will calculate the level of carbon dioxide and the excess air in the burner gas. Excess air is a major factor in reduction of efficiency, since this is just heated gas that is vented to the atmosphere.

The combustion efficiency is also calculated from these factors and the two temperatures. This is a very useful quantity to use for adjusting the burner. Combustion analyzers have the great advantage that they produce continuous readings and the effect of any changes made can be seen immediately.

The concentrations of the toxic gases are needed for pollution control, since these are tightly regulated in many countries and the local EPA will be checking them regularly. The fines for non-compliance can be very high and will often exceed the whole purchase price of a combustion analyzer.

Combustion analyzers consist of a probe which is placed inside the stack to sample the gas. This usually includes an integrated temperature measurement device, such as a thermocouple. The gas is drawn in by a pump over a filter and water trap to remove particulates and condensate from the gas.

In most cases, combustion analyzers are fitted with electrochemical sensors to measure the gas concentrations. These are relatively low cost, but will require calibration at regular intervals and replacement after a certain time. Certain, high-end combustion analyzers will be fitted with infrared sensors for some, if not all components.

The combustion analyzer is a very valuable tool for anyone working with burner systems who has to carry out periodic maintenance or adjustement.