

## **Combustion Information Sheet – Definitions**

To better understand your combustion, we have developed this page to assist you with basic explanations of test results.

<b>AMB °</b>	This is the temperature of the room air (burner supply air) in degrees Celsius or Fahrenheit, as indicated. (Actual Reading)
<b>Net T °</b>	The Net temperature is the flue temperature less the ambient temperature in degrees C or F, as indicated. (Calculated Reading)
<b>Flue °</b>	This is the temperature of the combustion gases at the boiler outlet or stack in degrees C or F, as indicated. (Actual Reading)
<b>Xair %</b>	Excess Air is calculated from the oxygen content and the type of fuel used. This is a percentage of the amount of oxygen in the boiler stack. (Calculated Reading)
<b>O2 %</b>	Amount of oxygen in the boiler outlet or stack after the combustion process. 0 – 20.9 % by volume. Low Fire typical (9 – 6 %) Hi Fire typical ( 6 – 3 %) for power burners. (Actual Reading)
<b>CO2 %</b>	Carbon Dioxide. This is a calculated number based on the actual O2 reading and the type of fuel burned. This is a major product of combustion, a greenhouse gas concern. (Calculated Reading)
<b>CO ppm</b>	Carbon Monoxide. Hydrocarbon based fuels can produce CO. Provincial requirements below 400 ppm air free test. We consider readings over 100 ppm to be an indication of incomplete combustion, affecting efficiency. Hi CO levels can create soot. CO is a colorless, odourless, lethal gas. (Actual Reading)
<b>NO ppm</b>	Nitric Oxide is released during the combustion process - considered a pollutant. (Actual Reading)
<b>NO2 ppm</b>	Nitrogen Dioxide is also released during the combustion process – considered a pollutant. (Actual Reading)
<b>NOX ppm</b>	Oxides of Nitrogen AKA Total Nitric Oxides. This is the sum of NO + NO2 Directly affects level of acid rain and ozone build-up in the atmosphere (greenhouse gases). Firetube boiler 40-80 ppm and Watertube boiler 50-100 ppm typical on Nat Gas. (Calculated Reading)
<b>SO2 ppm</b>	Sulphur Dioxide mixes with water vapour from combustion. SO2 is more likely found in fuel oils than natural gases. SO2 produces sulphuric acid mixture which contributes to acid rain and smog. (Actual Reading)
<b>POISON IND</b>	The poison index is a ratio of carbon monoxide / carbon dioxide as an indication of combustion. This ratio is a simple test to indicate if burner/boiler is operating properly. A reading of 0.100 or higher is an indication of a concern or problem that should be addressed. This is not currently a legal requirement. (Calculated Reading).
<b>EFF G %</b>	Gross efficiency is based on 100% fuel input less the (dry gas fuel losses + wet losses). Translation: The lower the oxygen number and the lowest net flue number with little or no CO, results in highest efficiency. Efficiency can also be reflected in "NET Efficiency" which is always higher than gross, as it assumes the latent heat is not lost up the flue. Gross efficiency assumes latent heat to be lost up the flue. (Calculated Reading)
<b>MP " wc</b>	Manifold Pressure reflected in " wc (inches watercolumn). Is an indication of gas pressure entering the burner near the burner head. It is used as a reference for fuel volume. Stamped MP is the Manufacturer's Reference to maximum fuel input of burner. (Actual Reading)
<b>Steam PSI KPA</b>	Used as reference to indicate pressure to temperature conversion of liquid temp in boiler. (From steam tables). Ex. 10 psi steam = 240F, so stack temp should never be below 240F. Low steam pressure can artificially inflate efficiency numbers. (Actual Reading)
<b>Water °</b>	Used as reference to indicate liquid temp in boiler. Stack temperature should never be below liquid temperature. Low water temp can artificially inflate efficiency numbers. Ex. If boiler normally runs 180F and combustion test is conducted at 100F, then efficiency will increase approx 2%. (Actual Reading)
<b>Emissions</b>	Values for CO, NO, NO2, & SO2 are <u>True Readings</u> meaning these readings were taken at the actual oxygen content at the time of the test. (Not oxygen corrected or referenced – unless noted on the combustion report).
<b>Test Eqpt</b>	For precision and accuracy it is important to ensure manometers, draft gauges, combustion analyzer, etc., are in good working order. Combustion analyzer should be calibrated yearly or more frequently, as required.