

# Combustion Analyzer

Standalone Combustion & Efficiency Calculator



FHinfinity Analyzers

**Combustion Analyzer**® is a specialized pre-simulation tool within FHinfinity® designed for standalone combustion calculations. Unlike the full heater simulation, this module allows engineers to quickly determine flue gas composition, fuel properties, and air requirements without defining heater geometry or coil layouts. It serves as an essential utility for both design verification and daily operational troubleshooting.

## Key Technical Features

**Flexible Fuel Modeling:** Supports Fuel Gas Only, Fuel Oil Only, or Combination Oil & Gas. Users can define fuel characteristics with options to overwrite non-hydrocarbon contents.

**Detailed Combustion Air Analysis:** Calculates precise air requirements based on Excess Air in Input Air or Excess O<sub>2</sub> in Flue Gas. Accounts for ambient conditions including temperature, pressure, and relative humidity.

**Atomizing Steam Integration:** For oil-fired applications, users can specify steam-to-oil ratios and steam temperature to accurately model atomization effects on combustion efficiency.

**Comprehensive Output:** Generates detailed reports on Flue gas composition (mass/volume %, dry/wet basis), Fuel properties (LHV, HHV, Wobbe Index, Density), Flame adiabatic temperature, ultimate analysis, etc.

## Unique Capability: Indirect Efficiency Calculator

A standout feature of the Combustion Analyzer is its built-in **Efficiency Calculator**, which enables rapid validation of field data without requiring a full heater model.

- **Field Data Cross-Check:** Operators often measure heater efficiency using portable analyzers (e.g., Testo). This tool allows you to input measured Flue Gas Temperature or Heat Absorbed to back-calculate thermal efficiency.
- **Two-Way Calculation:**
  - **Forward Mode:** Input heat absorbed → Calculate expected flue gas temperature.
  - **Reverse Mode:** Input measured flue gas temperature → Calculate actual heat absorption and efficiency.
- **Loss Breakdown:** Provides a clear heat balance sheet, distinguishing between heat input by fuel/air/steam and losses due to combustion inefficiencies.

