

Engineering Software

Copyright © 1996

P.O. Box 2134

Kensington, MD 20891

Phone: (301) 919-9670

E-Mail: info@engineering-4e.com

<http://www.engineering-4e.com>

Combustion Analysis

Here are some of the basic combustion information and plots when considering gas (methane) as the fuel and air as the oxidant.

Combustion Assumptions

- Fuel Temperature 298 [K]**
- Oxidant Temperature 298 [K]**
- Stoichiometric Combustion**
- No Heat Losses**

Fuel (Gas -- Methane) Composition

Element	Weight [kg/kg]	Mole [kmol/kmol]
CH_4	1.00	1.00

Oxidant (Air) Composition

Element	Weight [kg/kg]	Mole [kmol/kmol]
N	0.767	0.790
O	0.233	0.210

Combustion Schematic Layout

Fuel -- Gas (Methane)



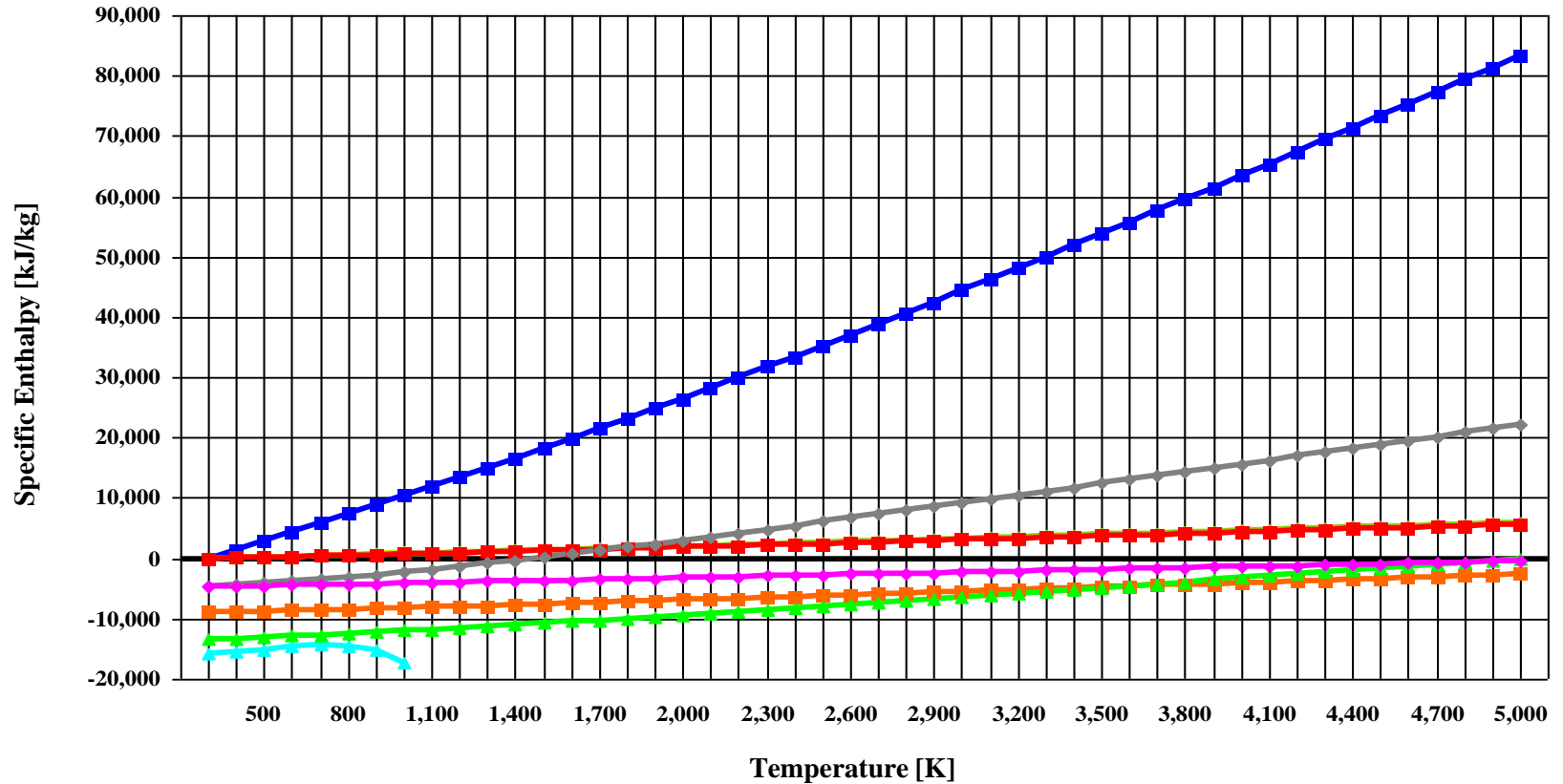
Oxidant -- Air

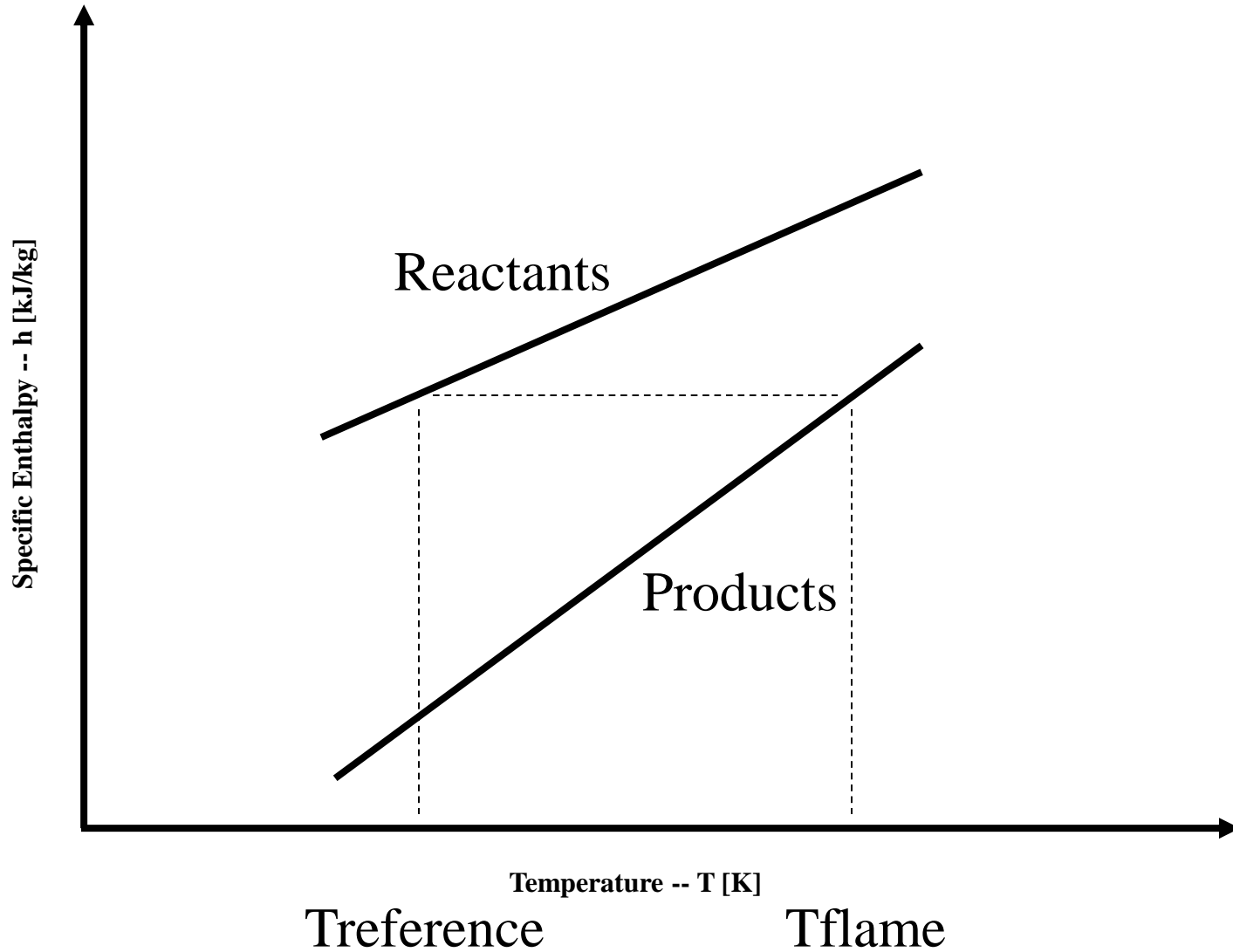


Combustion Products



Specific Enthalpy vs Temperature





Combustion $h - T$ Diagram

Combustion Products Composition

Element	Weight [kg/kg]	Mole [kmol/kmol]
CO ₂	0.151	0.095
H ₂ O	0.124	0.190
SO ₂	0.000	0.000
N ₂	0.725	0.715
O ₂	0.000	0.000

Combustion Values

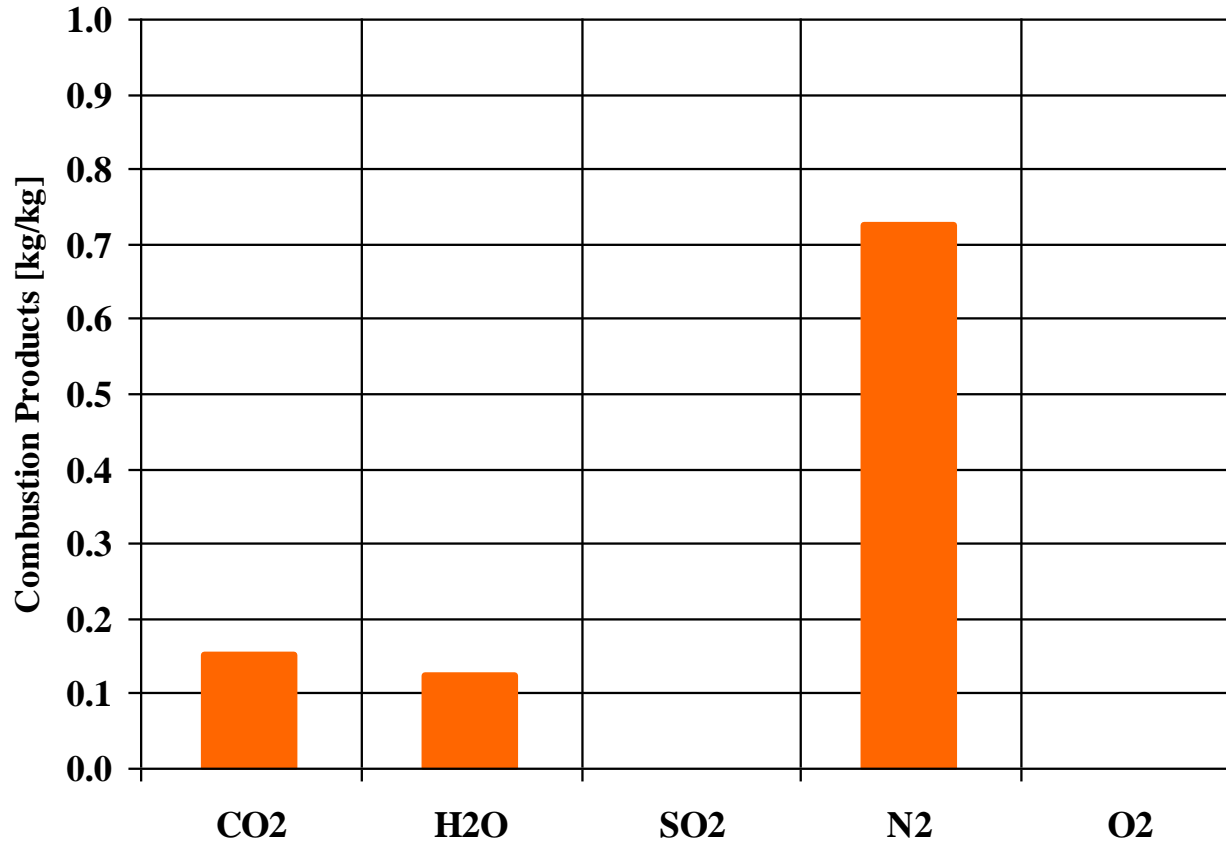
Flame Temperature

2,327 [K]

Oxidant To Fuel Ratio

17.167 [/]

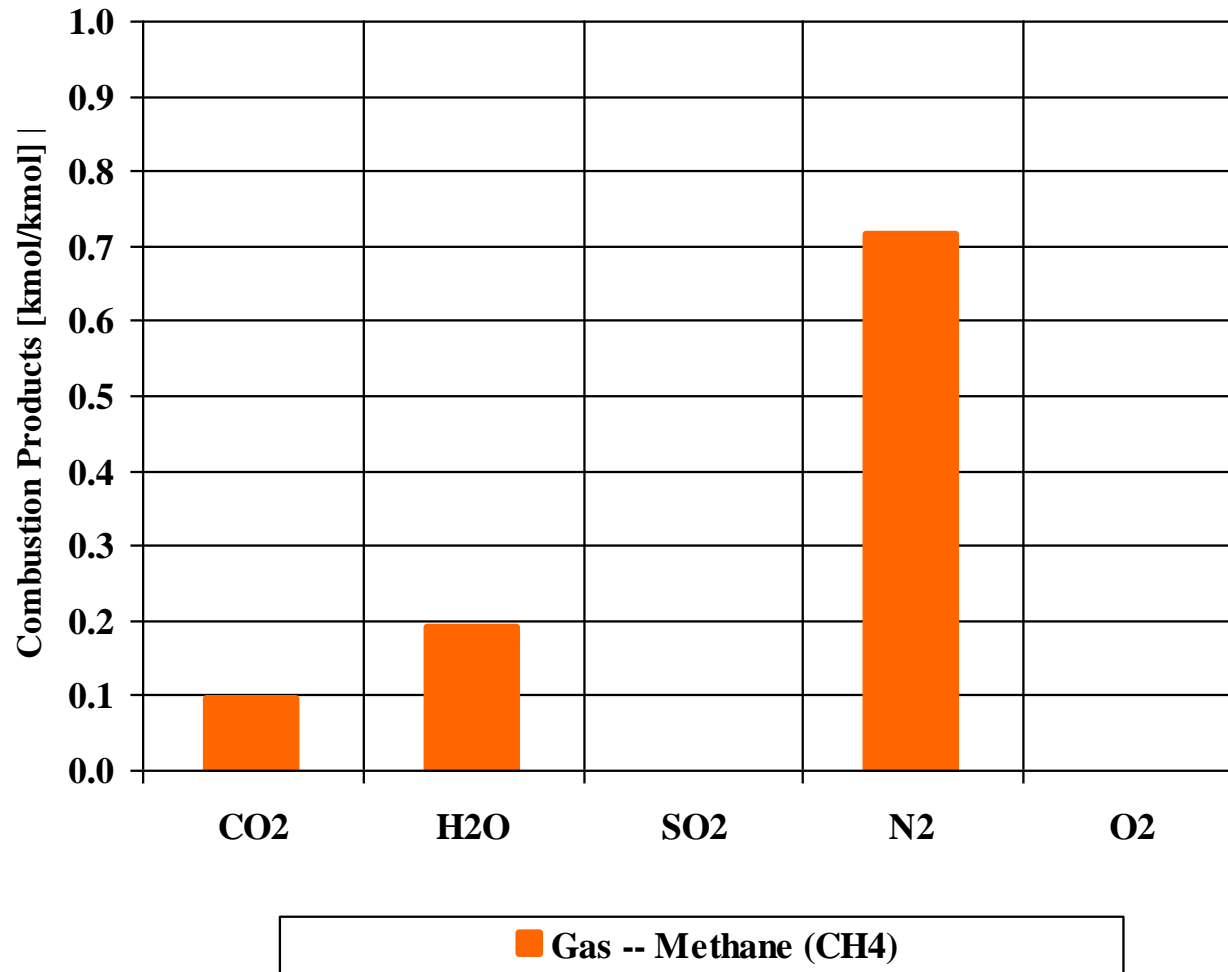
Combustion Products -- Weight Basis



Gas -- Methane (CH₄)

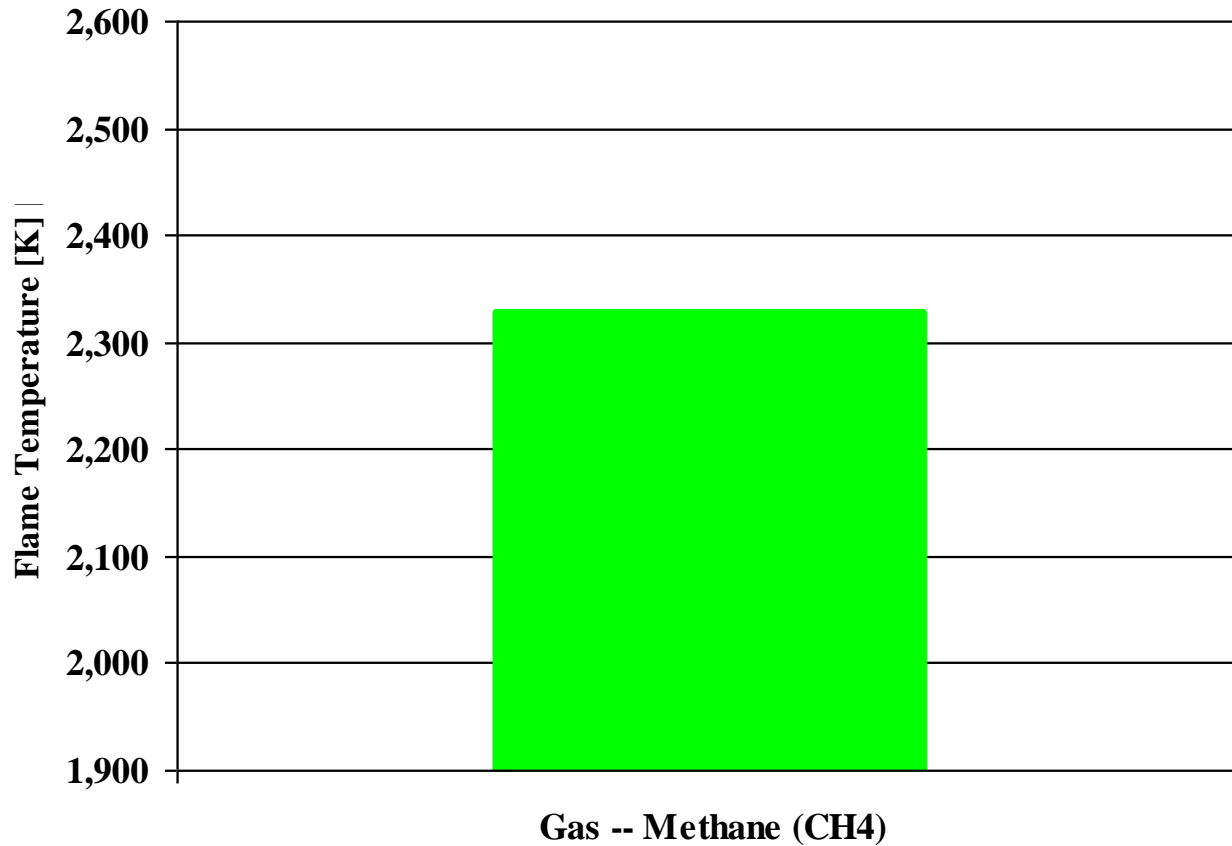
Fuel and Oxidant Inlet Temperature: 298 [K]

Combustion Products -- Mole Basis



Fuel and Oxidant Inlet Temperature: 298 [K]

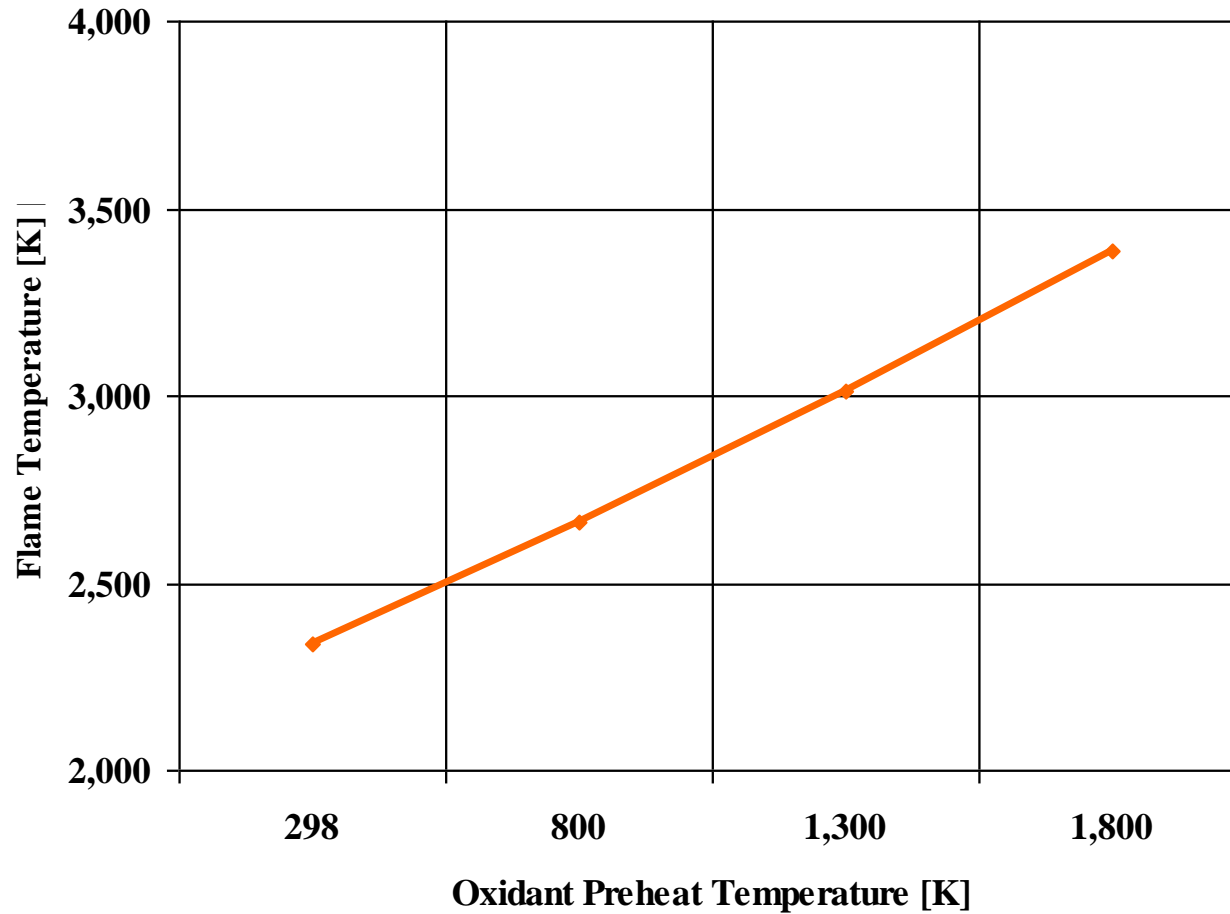
Combustion Products Flame Temperature



■ Flame Temperature [K]

Fuel and Oxidant Inlet Temperature: 298 [K]

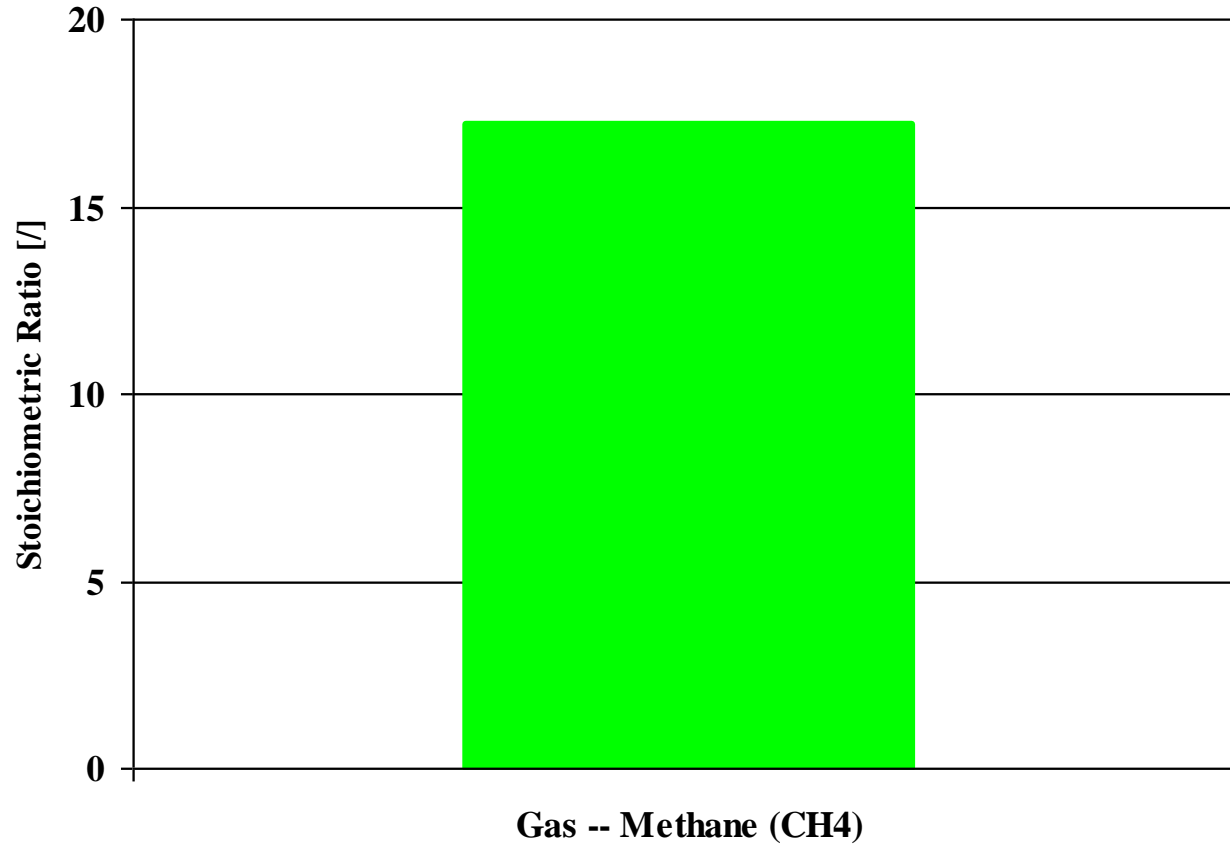
Combustion Products Flame Temperature (Gas as Fuel)



—◆— Flame Temperature [K]

Fuel Inlet Temperature: 298 [K]

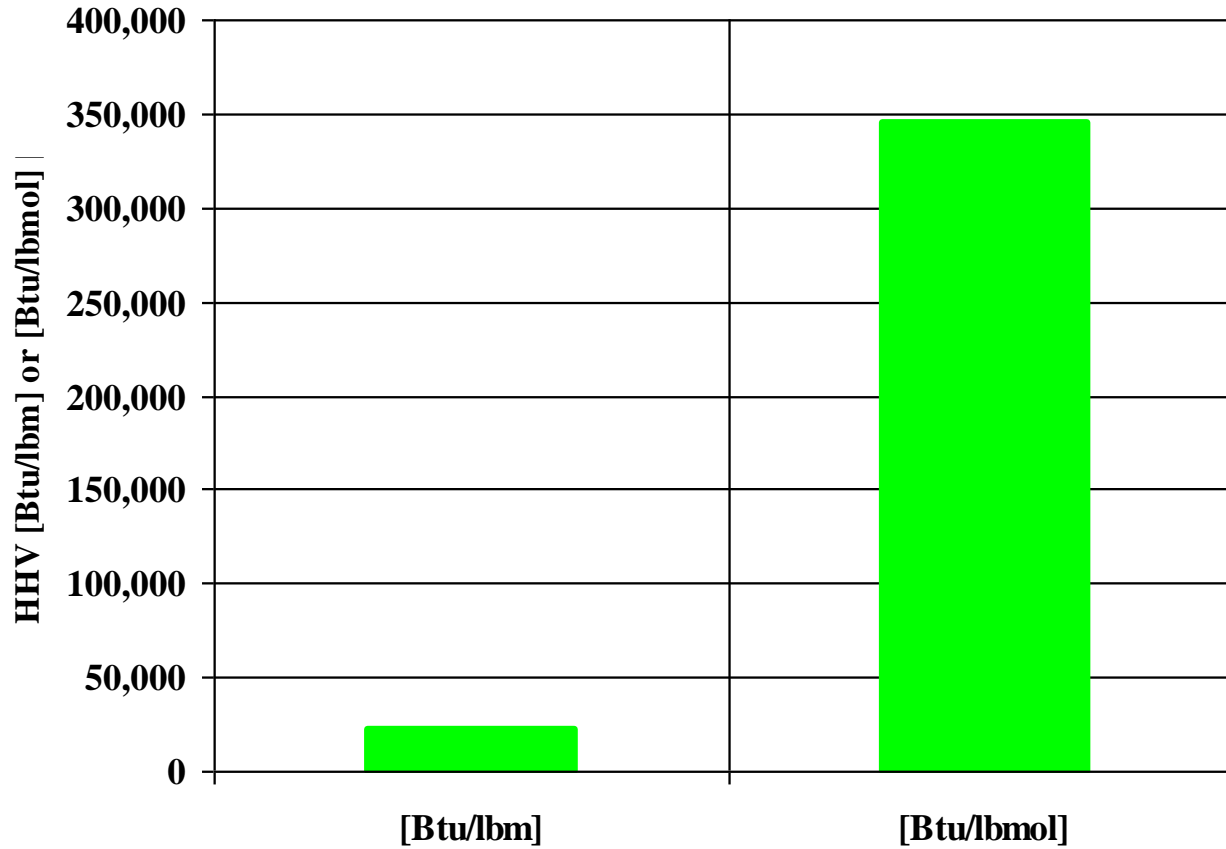
Combustion Stoichiometric Ratio



■ Stoichiometric Ratio (Oxidant to Fuel) [l]

Fuel and Oxidant Inlet Temperature: 298 [K]

Higher Heating Value (HHV)



■ HHV [Btu/lbm] or [Btu/lbmol]

Fuel and Oxidant Inlet Temperature: 298 [K]

Request for Free Information

To get a free evaluation copy of the **Engineering Software** product line, place an order, find out more about how you can profit or benefit from the product line, visit the **Engineering Software** web site at: <http://www.engineering-4e.com> or send an e-mail to info@engineering-4e.com or call **(301) 919-9670**.