

Gas Burner/Combustor

Phiet Vo

Kristin Lewis

Vartan Tenkerian

Malcolm D. Forbes

Part 1

http://www.lesman.com/unleashd/catalog/combustion/Maxon-Ovenpak-400/Maxon-Ovenpak-400_spec-1992-10.pdf

<u>Data</u>	<u>Source</u>
$Q_{in} = 146535 \text{ W}$	Model "400" OVENPAK® Gas Burner Data Sheet Page 2122 Model Number 405 <i>Converted from BTU to W</i>
$T_{132} = 632^{\circ}\text{C}$	Assumed to be at ignition temperature of natural gas
$q''_{out} = 706554 \text{ W/m}^2\cdot\text{K}$	<i>Calculated from Q_{in} over the cross-sectional area of the throat</i>
$k_{\text{Air @ } 25^{\circ}\text{C}} = 0.02605 \text{ W/m}\cdot\text{K}$	Textbook
$\text{Flowrate} = 0.531 \text{ m}^3/\text{s} \text{ (1125 CFM)}$	Model "400" OVENPAK® Gas Burner Data Sheet Page 2111 EB-1 OVENPAK <i>Calculated from SCFM at flame temp of Natural Gas ($T = 4020 \text{ R}$) and inlet pressure of $P = 14.91 \text{ psia}$</i>
Length = 203 mm	Model "400" OVENPAK® Gas Burner Data Sheet Page 2117 Model Number 405
Diameter of intake = 160.3 mm	Model "400" OVENPAK® Gas Burner Data Sheet Page 2117 Model Number 405
Diameter of throat = 321 mm	Model "400" OVENPAK® Gas Burner Data Sheet Page 2117 Model Number 405
$T_{\infty} = 632^{\circ}\text{C}$	Assume ignition temperature of natural gas
$T_i = 25^{\circ}\text{C}$	Assume initial temperature at ambient
$\dot{q} = 522.43 \text{ MW/m}^3$	<i>Calculated from heat of combustion of natural</i>

gas (i.e., 54 MJ/kg) and a density of 0.689 kg/m³

Part 2

