Eclipse Combustion

# FlueFire Burners

| PARAMETER | | SPECIFICATION | Typical Turbine Operating Conditions* |
|---|---|---|---|
| Maximum input per 150mm module @ 20% $O_2$ in kW (Btu/hr) For other % $O_2$ see page 2 | | 350 (1,190,000) | 200 (680,000) |
| Minimum input per 150mm module @ 20% $O_2$ in kW (Btu/hr) For other % $O_2$ see page 2 | | 15-25 (50,000 to 85,000) | 20 (68,000) |
| Gas pressures* in mbar ("w.c.) | Natural gas<br>Propane<br>Butane<br>low calorific gases | 430 (169)<br>187 (74)<br>142 (56)<br>depends on spec | Natural gas<br>140 (56.2) |
| % Process O2 (wet) up-stream<br>% Process O2 (wet) down-stream | | 11 - 21<br>9 min. | 15<br>10 |
| Process Temperature<br>up-stream ºC (ºF)<br>down-stream (uncooled combustion chamber) ºC (ºF)<br>down-stream (cooled combustion chamber) ºC (ºF) | | <br>700 (1300)<br>1000 (1800)<br>1200 (2200) | <br>500 (930)<br>900 (1650)<br>900 (1650) |
| ΔP across burner Pa ("w.c.) | | 80-120 (0.3-0.5) | 100 (0.4) |
| Process velocity across the burner<br>TEG mode in m/s ( fpm)<br>FA mode in m/s (fpm) | | <br>10-25 (2000-5000)<br>5-13 (1000-2600) | <br>20 (4000)<br>10 (2000) |
| $NO_X$ emissions* mg/MJ (lb./MMBtu/hr) | | 40 (0.10) | same |
| CO emissions* mg/MJ (lb./MMBtu/hr) | | 20 (0.05) | same |
| Process air distribution requirements | | +/- 15% in velocity across burner | same |
| Flame monitoring | | UV scanner only | same |

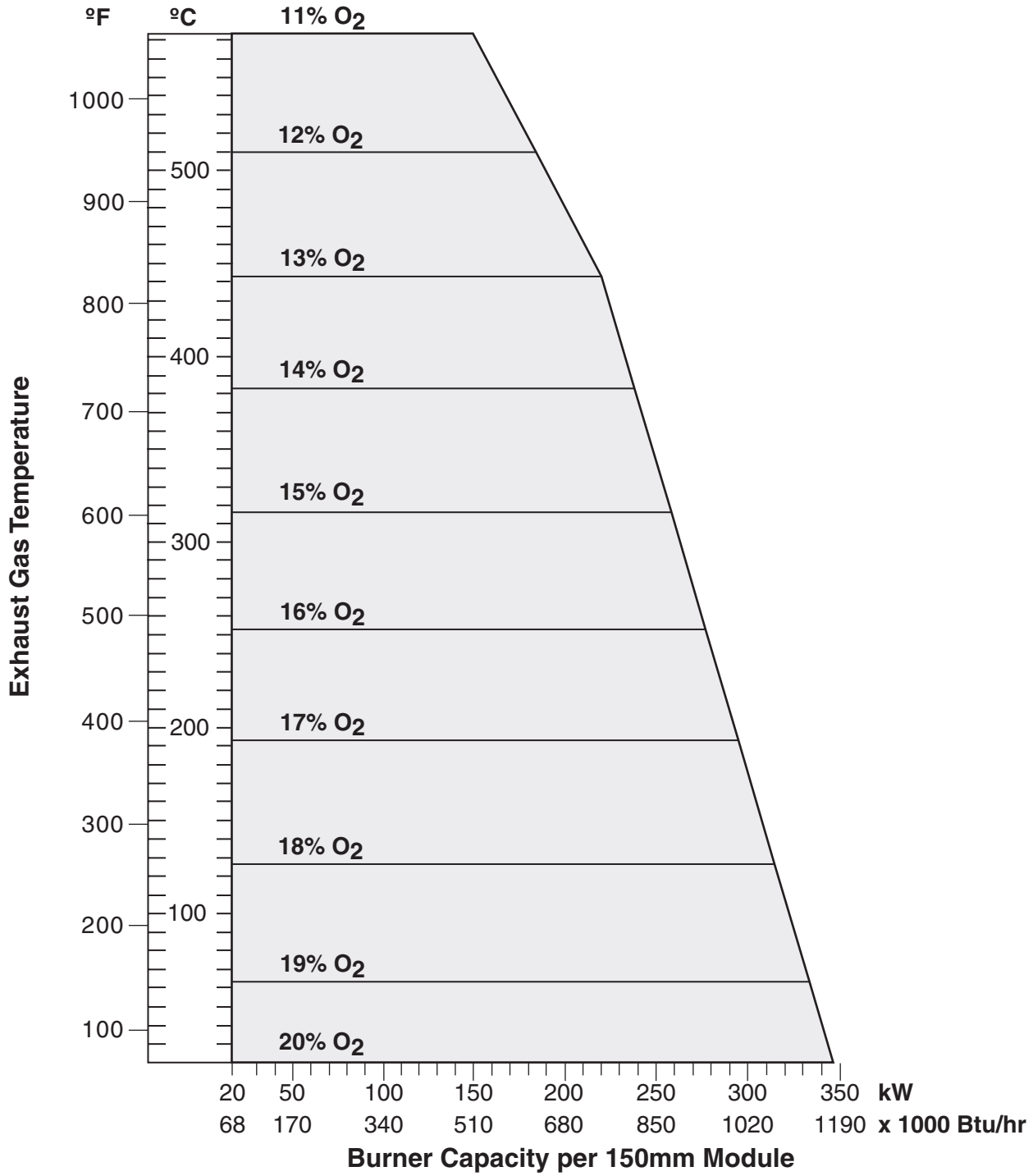
* Values are typical TEG conditions: TEG = Turbine Exhaust Gas, FA = Fresh Air
• Contact Eclipse for an estimate for data at non-standard conditions if not specified.
• All inputs based on net calorific values.

**Reference Data**

| Fuel Type | MJ/Nm3 | Btu/cu.ft. | d /s.g. |
|---|---|---|---|
| Natural gas | 39 | 1050 | 0.6 |
| Propane | 93 | 2500 | 1.5 |
| Butane | 123 | 3200 | 2.0 |

ECLIPSE™ Innovative Thermal Solutions

**Flue Fire Operational envelope:**



Introduction

The Eclipse Flue Fire Burner was developed by Eclipse for supplementary firing to heat turbine exhaust gases using the oxygen present within the exhaust flow to complete the combustion. The high heat release per burner module along with its heat resistant construction also will lend the burner to be applied to other applications requiring large heat inputs and high outlet temperatures.
At oxygen levels below the operating parameters of the burner, a supply duct can be provided to supply combustion air to the burner. Depending on the application, the burner can fire on ratio or with a fixed primary air supply as required for good combustion.

Description

Each burner module consists of a flame stabilizer with two gas nozzles. The stabilization plate is perforated to create a local swirl in the turbine exhaust gas or fresh air. Set into each module are two gas nozzles and one raw gas port. The combination of raw gas ports and nozzles ensures good flame stability over the entire operating range for both turbine exhaust gas and fresh air. The modules are held in place by the gas nozzles such that full thermal expansion is allowed.
Individual burner modules are mounted on a common manifold to form a row. Rows can be fired individually, or provided with flame propagation plates to promote cross-ignition from one burner row to another. The use of propagation plates accomplishes complete ignition of the burner at a single ignition point, instead of individual ignition points at each burner row. Flame sensing can now be accomplished by a reduced number of flame scanners.

Pilot burner

The pilot consists of a burner head with ignition plug, located outside the burner duct, and a flame extension tube to overcome the distance between pilot burner head and main burner row. The UV scanner is mounted on the pilot burner head to prove the pilot flame and the main flame after the pilot has been interrupted. A sight glass is provided to observe the pilot flame base only. The pilot assembly includes adjustable gas and air valves in order to obtain the required gas/air ratio and flame length.

Frame

The burner mounting frame is fabricated from heavy construction steel with internal insulation and is suitable for mounting in the duct work between the gas turbine and waste heat boiler. The burner rows are welded on the gas inlet side to the mounting frame. The opposite end is allowed to slide to account for thermal expansion.
Internal insulation consists of 8” thick ceramic fiber covered with a heat resistant cladding designed to allow thermal expansion.

Materials

The burner is completely manufactured from heat resistant materials as specified below

| | | |
|---|---|---|
| Gas Manifolds | AISI 316L | (Wst 1.4404) |
| Stabilization Plate | Avesta 253MA | (Wst 1.4893) |
| Gas Nozzles | AISI 321 | (Wst 1.4541) |


Offered By:
Power Equipment Company
2011 Williamsburg Road
Richmond, Virginia 23231
Phone (804) 236-3800
Fax (804) 236-3882

www.peconet.com