Heatflam CF Line Burner

- **Operational flexibility**
  - High moisture air streams
  - Low O_2 air streams
  - Highly inert air streams
  - Parallel velocities up to 4000 fpm, cross velocities up to 3000 fpm
- **Extremely low emissions** - NO_X levels of 25 ppm and CO levels of 250 ppm at 3% O_2 are possible. Contact your Heatflam sales representative about your specific application.
- **Temperature uniformity** to enhance product quality
- **Up to 25:1 turndown** for process flexibility
- **High firing capacity** - up to 2,500,000 Btu/hr/ft (732 kW/ft)
- **Nozzle-mixing line burner** for use with low pressure natural gas firing
- **Also available in stainless steel housings and nickel-plated body versions**

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Design and Application Details

Heatflam CF Burners are nozzle-mixing, modular line burners designed for a variety of fresh and recirculated air process heating applications. The burner is available in a variety of arrangements, including straight, grid and ladder sections. An external blower supplies combustion air.

The CF Burner is primarily used for in-duct firing. The CF Burner can be designed within a system to allow for up to 2,500,000 Btu/hr/ft (732 kW/ft). The maximum fuel pressures and air pressures required for varying maximum firing loads are described in the table below.

Test Connection Pressures

Maximum Capacity MMBtu/hr/ft	Required Air Pressure (inches w.c.)*	Required Fuel Pressure (inches w.c.)*
1.00	2.1	7.4
1.25	3.3	11.5
1.50	4.7	16.6
1.75	6.4	22.5
2.00	8.3	29.4
2.25	10.5	37.3
2.50	13.0	46.0

*Differential pressures measured at test connection. Air and gas DP is differential over system static pressure.

Test Connection Pressures (metric)

Maximum Capacity kW/ft	Required Air Pressure (mbar)*	Required Fuel Pressure (mbar)*
300	5.2	18.4
375	8.2	28.6
450	11.7	41.3
525	15.9	56.0
600	20.7	73.2
660	26.2	92.9
732	32.4	114.6

*Differential pressures measured at test connection. Air and gas DP is differential over system static pressure.

Principle of Operation

The design of the CF burner allows for extremely low emissions of both NO_X and CO. Impingement of a series of jets containing a substantially homogeneous mixture of fuel and air creates stability and extremely short flame lengths. The high excess air translates into low NO_X levels. The inherently stable design allows operation of the burner in a fuel lean condition without creating high levels of CO.

The burner performs optimally at a specific fuel/air ratio throughout the firing range. Deviation from the optimum fuel/air ratio will result in trade-off between NO_X and CO emissions. For example, a fuel lean setting (in reference to optimum fuel/air ratio) will result in lower NO_X emissions but higher CO emissions. Conversely, a fuel rich setting, again in reference to the optimum fuel/air ratio, will result in higher NO_X emissions with lower CO levels.

The fuel/air ratio is controlled by a Heatflam MICRO-RATIO® Valve throughout the operating range. The MICRO-RATIO® Valve allows for a variable fuel ramp corresponding to the chosen maximum lineal firing duty. The MICRO-RATIO® Valve is sized according to the fuel and air flow requirements for the entire combustion system. For MICRO-RATIO® Valve sizing information,
see Sections 7000 and 7100 of the Heatflam product catalog.

For optimum performance and emissions control in applications with variable process flow, use Heatflam's SMARTFIRE™ Intelligent Combustion Control System. See Heatflam catalog section 7200 for more details.