

FABER *Burner Company*

L_xE PERFORMER SERIES PACKAGE BURNERS



Bulletin L_xE-1

The Ultimate Combustion System

L_xE Performer Series Package Burners

*For Your Process Heater, Firetube, and
Small Watertube Boiler Applications*

Faber's *L_xE Performer Series* is a family of engineered combustion systems of unmatched quality, performance, and design flexibility. The *L_xE* family of package burners is your solution for the optimal firing of liquid and gaseous fuels for applications in which safety, reliability, efficiency, and longevity are essential.



L_xE package burners are fully modular combustion systems comprised of the following modules that are carefully selected based upon your projects unique requirements and conditions:

- Body Assembly
- Register Assembly
- Throat
- Forced Draft Fan & Silencer Assembly
- Pilot, Fuel, & Atomizing Piping Trains
- Flame Safeguard, Safety Limits & Combustion Controls
- Auxiliary Equipment
- Power Control Equipment

The *L_xE Performer Series* Family Includes Three Exceptional Burner Models:

The LE Package Burner

Oil or Gas Fired — Ideal for projects when low NO_x emissions are not required. The LE is an excellent heavy oil burner.

The L₃E Package Burner

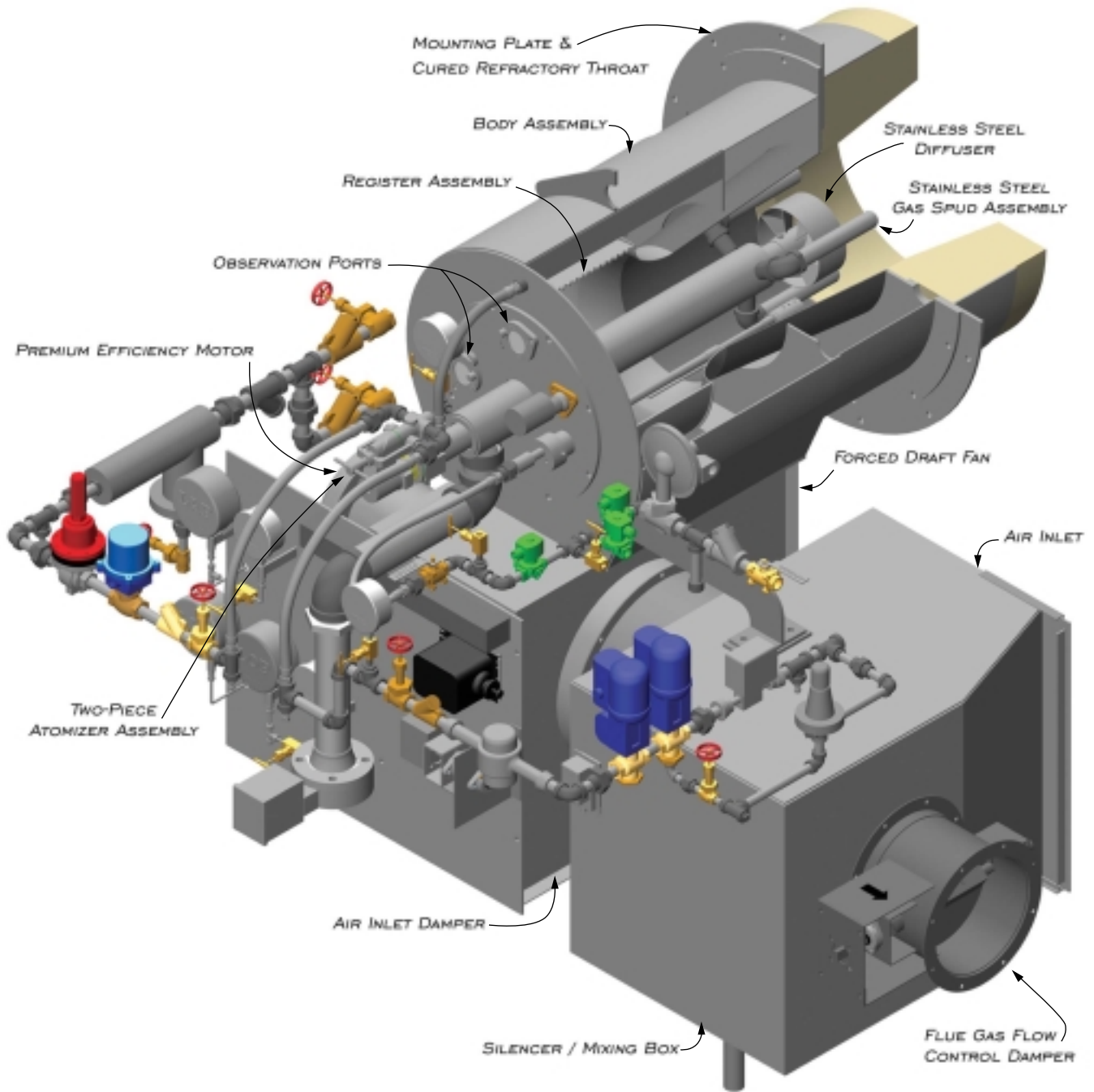
Oil or Gas Fired — Perfect for projects when NO_x emission requirements are from 15 to 30 ppm.

The L₄E Package Burner

Oil or Gas Fired — Perfect for projects when NO_x emission requirements are from 9 to 25 ppm.

Note: Emissions given above are for natural gas firing and dry flue gas at 3% excess oxygen.

The Anatomy Of An L_xE Package Burner



(Model: L₃E Package Burner)

All L_xE Performer Series Package Burners Have These Impressive Benefits & Features:

Physical Design

Engineering, Quality Components, And Versatility Result In A Superior Product

- **Engineered System** – The total combustion system is designed using the latest in solid modeling technology to guarantee optimal performance, furnace/boiler compatibility, proper fit of all modules, and a user-friendly layout.
- **Heavy-Duty Construction** – Built for decades of operation. Burner body assemblies are fabricated from 3/16" steel and the burners modules are comprised of industrial quality components from such manufacturers as Allen-Bradley, ASCO, Chicago Blower, Dwyer, and Maxon. L_xE package burners come standard with stainless steel impregnated paint to withstand the harshest of conditions.
- **Flexible Design** – L_xE package burners are the best choice to meet your project's most diverse requirements: Available from 300 to 2000 HP • Layout customized to best fit your boiler or process needs • Flame geometry tailored to your furnace • Modular design for field installation in the tightest of locations • Custom control systems • Specialized wiring • Unique fuels.



User-Friendly Design

Easy To Install, Operate, And Maintain

- **Ready To Operate** – Prior to shipment, each combustion system is thoroughly inspected and rigorously tested on our process simulator to make certain the package burner arrives ready for operation.
- **Practical** – L_xE package burners are combustion systems in their simplest but most refined form. They are logically laid out for ease of operation and maximum accessibility to all burner components. Here are just a few of the many exceptional features that distinguish the L_xE: Cured refractory throat & mounting plate, two 2 ½ " sight ports, ball/swivel scanner mount, as well as an industrial quality ignitor and two-piece oil atomizer assembly, both of which may be easily removed for inspection & cleaning without dismantling the burner.
- **Non-Proprietary** – You are not held hostage by a manufacturer's sole source parts that require specialized service. Our piping and electrical systems are comprised of industrial quality, brand name, readily available components that are easy to use, maintain, and service.
- **Smooth & Quiet Operation** – Meets OSHA sound exposure requirements. A forced draft fan silencer and quiet running premium efficiency motor are an integral part of the L_xE design.

Efficient Design

Results In Quick Return On Investment And Phenomenal Savings Throughout The Life Of The Equipment

- **High Mix Combustion Efficiency** – Determined by a burner’s ability to homogeneously mix fuel and air in the combustion process. Although excess air is inevitable in combustion, excess air also removes heat from the furnace, adversely affecting efficiency. L_xE burners operate at extremely low excess air levels (2% - 4% O₂ in flue gas) when firing both liquid and gaseous fuels. L_xE burners can operate at lower excess air levels than other burners (1 – 2 % lower O₂ in flue gas while firing natural gas) and (1 – 3 % lower O₂ while firing #2 Oil), while still meeting NO_x emissions, without smoke and negligible CO. Low excess air operation results in high boiler efficiency, saving you money in fuel costs.
- **Energy Efficiency** – Faber’s low pressure drop register design, in conjunction with a highly efficient forced draft fan configuration equipped with both a low leakage inlet vortex control damper and a premium efficiency motor, results in reduced power consumption.
- **Thermal Turndown** – Expressed as a ratio between a burner’s maximum and minimum operating heat inputs. Higher turndown provides greater operating flexibility and reduces burner cycling. When a burner cycles, it flushes the hot furnace with ambient air, pulling heat out of the furnace and significantly reducing fuel efficiency. Turndowns of 6:1, to 10:1 are standard with L_xE package burners, but can be dramatically increased to meet the requirements of your project.

The Bottom Line

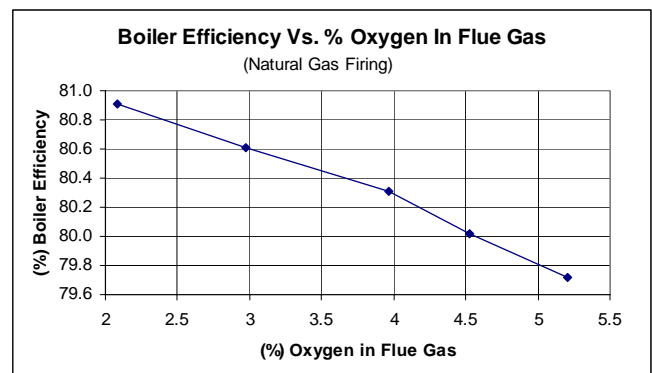
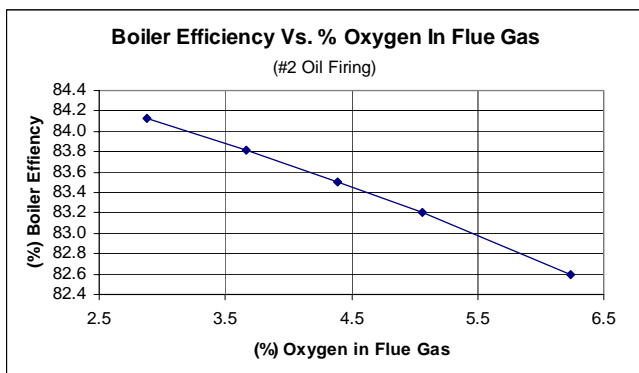
Buying Combustion Equipment Is A Business Decision.
Don’t Throw Away Millions To Save Thousands!

When purchasing combustion equipment, there are many factors to consider: Durability • Reliability • Serviceability • Ease of operation • Current & future emission regulations • Initial cost • Operating costs. Of all of these items, initial cost is the easiest to compare, but too often the most influential. Don’t be enticed by a lower purchase price, only to find out later that you have to pay more for fuel and electricity every month for as long as you own the equipment.

Comparing Operating Costs

Collect Data

1. At what excess air levels can the proposed burner *really* operate?
 - A. Firing oil?
 - B. Firing gas?



2. What is the burner's total electrical power consumption?
 - A. FD fan motor horsepower?
 - B. Oil pump horsepower?
 - C. Air compressor horsepower?
3. Is the manufacturer willing to provide actual operating data and references to support burner performance? Faber Burner Company believes in supplying customers with ample product information, as well as performance data. We back up our facts with firm guarantees, while others may only make performance and emission "predictions" or "expectations."
4. Will the burner operate as efficiently and consume less power than the L_xE burner, while still meeting all the project's emission requirements?

Evaluate Data

1. Use The Simplified Formulas Below to Determine Efficiency And Fuel Consumption:

Determine the approximate boiler efficiency

- A. Boiler efficiency for oil firing = $85.49 - 0.4578 \times (\% \text{ O}_2 \text{ in flue gas})^*$
- B. Boiler efficiency for gas firing = $81.72 - 0.3756 \times (\% \text{ O}_2 \text{ in flue gas})^*$

Determine annual fuel consumption

- C. Annual oil consumption (Gallons) =
$$\frac{\text{Steam Flow (lb/hr)} \times 6,346.5^*}{\text{Boiler Efficiency (\%)}^*}$$
- D. Annual gas consumption (SCF) =
$$\frac{\text{Steam Flow (lb/hr)} \times 876,876^*}{\text{Boiler Efficiency (\%)}^*}$$

Example:

Brand (X) burner firing oil at 5.2% O₂ yields a boiler efficiency of 83.11%.

An L_xE burner firing oil at 3.0 % O₂ yields a boiler efficiency of 84.12%

The L_xE burner will provide (84.12% – 83.11% = 1.01%) more efficiency than the brand (X) burner while firing #2 fuel oil.

In determining the approximate fuel consumption for a 600HP oil fired boiler that will operate at an annual average firing rate of 55% (10,725 lb/hr steam) of its rated capacity to meet the production demands:

The boiler with the brand (X) burner, firing oil at an efficiency of 83.11%, will consume 818,989 gallons of #2 fuel oil.

The boiler with a L_xE burner, firing oil at an efficiency of 84.12%, will consume 809,156 gallons of #2 fuel oil.

Fuel Savings

Due to its ability to operate more efficiently, the L_xE burner will use 9,833 gallons less than the brand (X) burner. At \$1 per gallon, this is an annual savings of \$9,833.00.

2. Compare the electrical operating costs:
 - A. Total the required horsepower to operate each combustion system.
 - B. Convert horsepower to annual kilowatt hours by using this formula:
Annual kilowatt hours = Total horsepower x 6532

Example:

A brand (X) 600HP low NOx dual fuel package burner requires a 40HP FD fan motor, a 7.5HP air compressor motor, and a 3/4HP oil pump motor.

Total required horsepower = 48.25.

A Faber 600HP L3E low NOx dual fuel package burner requires a 20HP FD fan motor, a 10HP air compressor motor, and a 1HP oil pump motor.

Total required horsepower = 31.

The L_xE burner uses 17.25 less horsepower than the brand (X) burner.

The brand (X) 600HP low NOx burner will consume 315,169 kilowatt hours annually if operated continuously.

The Faber 600HP L_xE low NOx burner will consume 202,492 kilowatt hours annually at continuous operation.

Electrical Savings

The L_xE burner will consume 112,677 kilowatt hours less than the brand (X) burner. At \$0.09 per kilowatt hour, this is an annual savings of \$10,140.93.

Conclusion

When selecting combustion equipment for your upcoming project, it is extremely important to perform a comprehensive product evaluation by analyzing all aspects of the burner equipment, especially operating costs. Choosing the wrong equipment can be a very frustrating and extremely costly experience. In the above example, a 600HP steam boiler operating continuously for one year and firing oil at approximately 55% load, the L_xE burner results in a potential annual operational savings of \$19,973.93.

* Calculations based on ASME PTC 4.1 Efficiency Test Form with inputs of 100 PSIG saturated steam operating pressure, 220°F feedwater, 425°F boiler stack temperature, 1000 BTU/ft³ Natural Gas, 138,166 BTU/Gallon #2 fuel oil.



FABER
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PROVIDING COMBUSTION SOLUTIONS USING HIGH-PERFORMANCE,
USER-FRIENDLY, AND ENVIRONMENTALLY RESPONSIVE TECHNOLOGY

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