FABER
Burner Company

$\textit{L}_x\textit{E}$ Performer Series Package Burners

FABER
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QUALITY
COMBUSTION EQUIPMENT
SINCE 1926

Bulletin $\textit{L}_x\textit{E}$-1
Faber’s LxE Performer Series is a family of engineered combustion systems of unmatched quality, performance, and design flexibility. The LxE 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.

LxE package burners are fully modular combustion systems comprised of the following modules that are carefully selected based upon your project's 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 LxE Performer Series Family Includes Three Exceptional Burner Models:

**The LE Package Burner**
- Oil or Gas Fired — Ideal for projects when low NOx emissions are not required. The LE is an excellent heavy oil burner.

**The L₃E Package Burner**
- Oil or Gas Fired — Perfect for projects when NOx emission requirements are from 15 to 30 ppm.

**The L₄E Package Burner**
- Oil or Gas Fired — Perfect for projects when NOx 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 LXE Package Burner

(Model: LXE Package Burner)
All \textit{LxE Performer Series Package Burners} Have These Impressive Benefits & Features:


\textbf{Physical Design}  
Engineering, Quality Components, And Versatility Result In A Superior Product

- \textbf{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.

- \textbf{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. LxE package burners come standard with stainless steel impregnated paint to withstand the harshest of conditions.

- \textbf{Flexible Design} – LxE 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.

\textbf{User-Friendly Design}  
Easy To Install, Operate, And Maintain

- \textbf{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.

- \textbf{Practical} – LxE 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 LxE: 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.

- \textbf{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.

- \textbf{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 LxE 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. LXE burners operate at extremely low excess air levels (2% - 4% O2 in flue gas) when firing both liquid and gaseous fuels. LXE 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 NOx 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 LXE 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?

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**Boiler Efficiency Vs. % Oxygen In Flue Gas**

(#2 Oil Firing)

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<th>Boiler Efficiency</th>
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**Boiler Efficiency Vs. % Oxygen In Flue Gas**

(Natural Gas Firing)

<table>
<thead>
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<th>% Oxygen in Flue Gas</th>
<th>Boiler Efficiency</th>
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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 LxE 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\% O\(_2\) yields a boiler efficiency of 83.11\%.

   **An L\(_x\)E burner** firing oil at 3.0 \% O\(_2\) yields a boiler efficiency of 84.12\%

   The L\(_x\)E 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\(_x\)E 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\(_x\)E 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.
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 LxE 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.

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**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 LxE 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 L3E low NOx burner will consume 202,492 kilowatt hours annually at continuous operation.**

**Electrical Savings**

The LxE 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.

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**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 LxE burner results in a potential annual operational savings of $19,973.93.