

# **PROFIRE® BURNER SOLUTIONS**

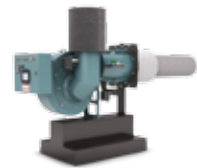
Complete burner systems for large or small applications

# The right burner for virtually any application

Cleaver-Brooks provides a full line of high-quality, low-emissions burners that are specifically engineered to increase your boiler's efficiency and decrease fuel costs and emissions. Our commitment to research and development assures Cleaver-Brooks customers of having the most technologically advanced burner systems available.

Innovative features help the Cleaver-Brooks ProFire® line improve the performance of any boiler. With the flexibility of multiple fuel options and the availability of high turndown burners, there is a Cleaver-Brooks burner appropriate for commercial, industrial, and institutional applications.

Designed for maximum efficiency and low emissions, Cleaver-Brooks offers the right burner solution for virtually any boiler room retrofit application. With our extensive engineering expertise and vast aftermarket support network, we can help determine what burner is right for you, regardless of boiler manufacturer.



	Capacity	Fuel	NOx Levels	Recommended Boiler Types	Recommended Uses
<b>XL-Series</b> (page 4)	37.8 to 92.4 MMBTU input range / 900 to 2,200 HP	Gas, #2 oil, and combination	Available to less than 9 ppm NOx	Firetube Industrial Watertube	Industrial Heavy Industrial
<b>E-Series</b> (page 5)	8.4 to 42.0 MMBTU input range / 200 to 1,000 HP	Gas, #2 oil, and combination	Available to less than 30 ppm NOx	Commercial Watertube Firebox Thermal Fluid Heater Firetube Industrial Watertube	Commercial Light Industrial Industrial
<b>D-Series</b> (page 6)	3.36 to 42.0 MMBTU input range / 80 to 1,000 HP	Gas, #2-#6 oil, combination, alternative fuels	Available to less than 9 ppm NOx	Firebox Thermal Fluid Heater Firetube Industrial Watertube	Light Commercial Commercial Light Industrial Industrial
<b>MTH-Series</b> (page 7)	2.5 to 16.0 MMBTU input range / 60 to 380 HP	Gas only	Available to less than 9 ppm NOx	Cast Iron Hot Air Furnace Firetube Commercial Watertube Thermal Fluid Heater Firebox Process / Line Heaters	Light Commercial Commercial Light Industrial
<b>NTH-Series</b> (page 8)	2.5 to 12.5 MMBTU input range / 60 to 300 HP	Gas, #2 oil, combination	Available to less than 9 ppm NOx	Firebox Thermal Fluid Heaters Industrial Watertube Commercial Watertube	Light Commercial Commercial Light Industrial
<b>M-Series</b> (page 9)	1.4 to 10.5 MMBTU input range / 33 to 250 HP	Gas, #2-#6 oil, combination, alternative fuels	Uncontrolled NOx only	Cast Iron Hot Air Furnace Commercial Watertube Firebox Thermal Fluid Heater Firetube	Light Commercial Commercial Light Industrial
<b>V-Series</b> (page 10)	1.3 to 16.8 MMBTU input range / 31 to 400 HP	Gas, #2 oil, and combination	Available to less than 30 ppm NOx	Cast Iron Hot Air Furnace Commercial Watertube Firebox Thermal Fluid Heater Firetube	Light Commercial Commercial Light Industrial
<b>Q-Series</b> (page 11)	.375 to 2.5 MMBTU input range / 9 to 60 HP	Gas Only	Uncontrolled NOx only	Firetube	Light Commercial Commercial Light Industrial Industrial

# Vertical or Horizontal Configuration

The ProFire®-XL series is offered in two standard configurations, vertical and horizontal. Vertical configurations support capacities ranging from 37.8 to 63.0 MMBTU, and horizontal configurations support capacities from 67.2 to 92.4 MMBTU. The standard low-NOx and ultra low-NOx vertical and horizontal configurations are capable of burning natural gas, propane gas, air-atomized #2 oil, propane air mix (NTXL only), as well as combination gas/#2 oil. Full modulation operation is standard, and a parallel positioning system is required for burner management and combustion control.

## ProFire®-XL



**Available to** less than 9 ppm NOx (LNXL/NTXL)

**1,800/3,600 rpm Combustion Fan**  
motor horsepower is based on NOx and capacity requirement

**Air-atomizing**, low-pressure oil nozzle (steam atomization optional)

**V-port oil flow control valve** is used for maximum capacity and precise oil flow control

**Parallel Positioning** required for optimal control throughout the firing range

**Hinged Rear Door and Access Panels** for easy access to internal components

**Gas Manifold** on oil burners standard for easy upgrade to combination units

**Combustion Air Fan** efficient airfoil blade design smoothly lifts airflow over the entire blade, resulting in less motor horsepower requirement and significant noise reduction when compared to standard forced-draft fans

**#2 Oil** capability for backup fuel (LNXL/NTXL)

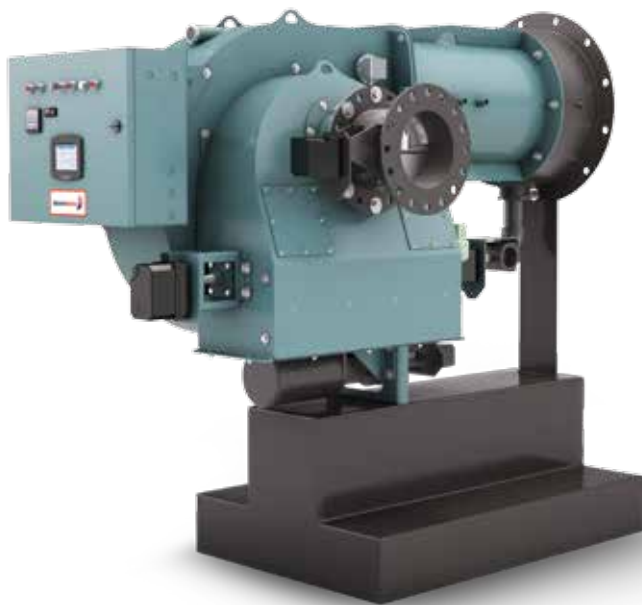
	Uncontrolled Emissions	Less than 30 ppm	Less than 15 to 9 ppm
<b>MMBTU (Gas Input)</b>	37.8 – 92.4	37.8 – 92.4	37.8 – 92.4
<b>GPH (Oil Input)</b>	270 – 660	270 – 660	270 – 660
<b>BHP (BHP = 33,475 BTU/hr)</b>	900 – 2,200	900 – 2,200	900 – 2,200
<b>Fuels</b>	Gas, #2 Oil, Combination	Gas, #2 Oil, Combination	Gas, #2 Oil, Combination



# High Turndown and Low NOx

The ProFire®-E series burner offers: natural gas, propane gas, air-atomized #2 oil, and combination gas and oil fuel options from 8.4 to 42.0 MMBTU. The LNE burner, capable of less than 30 ppm NOx emissions, offers: natural gas, propane gas, air-atomized #2 oil, and combination gas and oil fuel options from 8.4 to 42.0 MMBTU. Full modulation operation and cam trim are standard for greater efficiency and cost savings.

## ProFire®-E



**Low-pressure,** air-atomizing system on oil with rotary vane compressor

**Piston-type** positive displacement oil metering system

**Cam Trim** 14-point adjustment range

**Parallel Positioning** available for optimal control throughout the firing range

**Rotary Air Damper** precise fuel-to-air ratios

**Hinged Air Housing** for easy access to internal components

**Gas Manifold** on oil burners standard for easy upgrade to combination units

**Combustion Air Fan** efficient airfoil blade design smoothly lifts airflow over the entire blade, resulting in less motor horsepower requirements and significant noise reduction when compared to standard forced-draft fans

**Induced FGR** FGR modulating valve and shutoff valve (LNE)

**#2 Oil** capability for backup fuel (LNE)

**UL and cUL** listed

	Uncontrolled Emissions	Less than 30 ppm
<b>MMBTU (Gas Input)</b>	8.4 – 42.0	8.4 – 42.0
<b>GPH (Oil Input)</b>	60 – 300	60 – 270
<b>BHP (BHP = 33,475 BTU/hr)</b>	200 – 1,000	200 – 1,000
<b>Fuels</b>	Gas, #2 Oil, Combination	Gas, #2 Oil, Combination

# High Efficiency and Fuel Versatility

The ProFire®-D series burner offers: natural gas, propane gas, air-atomized #2–#6 oil and combination gas and oil fuel options from 4.2 to 42.0 MMBTU. The LND burner, capable of less than 20 ppm NOx emissions, offers: natural gas, propane gas, air-atomized #2–#6 oil, and combination gas and oil fuel options from 3.36 to 42.0 MMBTU. The ultra low-NOx D series offers natural gas, propane air mix, air atomized #2 oil, and combination gas/oil fuel at capacities from 12.6 to 33.6 MMBTU. Full modulation operation and cam trim are standard for greater efficiency and cost savings. The D burner is an excellent choice when firing alternative fuels such as digester, waste oil, and biodiesel.

## ProFire®-D



**Low-pressure,** air-atomizing system on oil with rotary vane compressor

**Piston-type** positive displacement oil metering system for precise oil control

**Cam Trim** 14-point adjustment range

**Parallel Positioning** available for optimal control throughout the firing range

**Nozzle Line Electric Heater** standard on medium to heavy oil burners

**Rotary Air Damper** for precise fuel-to-air ratios

**Hinged Air Housing** for easy access to internal components

**Gas Manifold** on oil burners standard for easy upgrade to combination units

**Backward-Curved Impeller** provides adequate combustion air for various furnace pressures and high-altitude applications

**Induced FGR** FGR modulating valve and shutoff valve (LND)

**#2 Oil** capability for backup fuel (LND/NTD)

**UL and cUL** listed (D/LND)

	Uncontrolled Emissions	Less than 20 ppm	Less than 15 to 9 ppm
<b>MMBTU (Gas Input)</b>	4.2 – 42.0	3.36 – 42.0	12.6 – 33.6
<b>GPH (Oil Input)</b>	30 – 300	24 – 300	90 – 240
<b>BHP (BHP = 33,475 BTU/hr)</b>	100 – 1,000	80 – 1,000	300 – 800
<b>Fuels</b>	Gas, #2–#6 Oil, Combination	Gas, #2–#6 Oil, Combination	Gas, #2 Oil, Combination



# Low-NOx No FGR Required

The standard MTH series includes full modulation with parallel positioning and offers natural gas and propane gas from 2.5 to 16.0 MMBTU. Capable of low NOx/CO emissions without FGR, the MTH series features a rugged FeCrAl-M alloy fiber material combustion element with metal fiber construction over a stainless steel frame, providing flexibility, longevity and trouble-free operation for the life of the burner. The design is ideal for use with applications where low emissions are required and FGR is impractical or inaccessible. The MTH burner with surface stabilized combustion guarantees reliable and quiet operation.

## ProFire®-MTH



**Parallel Positioning** standard for optimal control throughout the firing range

**Premix Fuel** allows uniform flame distribution, low CO emissions and high turndown

**Rugged Surface Stabilized Premix Combustion Element** ensures quiet combustion and low NOx/CO emissions throughout the entire firing range

**Hinged Air Housing** for easy access to internal components

**Removable Mantle** can be serviced, inspected and replaced without disconnection of fuel or power lines

**Low-NOx Emissions** achieved without FGR

**Combustion Air Fan** efficient airfoil blade design smoothly lifts airflow over the entire blade, resulting in less motor horsepower requirements and significant noise reduction when compared to standard force draft fans

**Inverted Configuration** available in lieu of standard configuration to meet space requirements

	Uncontrolled to 9 ppm
<b>MMBTU (Gas Input)</b>	2.5 – 16.0
<b>GPH (Oil Input)</b>	Not Applicable
<b>BHP (BHP = 33,475 BTU/hr)</b>	60 – 380
<b>Fuels</b>	Gas Only





# Furnace and Heater Applications

The NTH series burner offers: natural gas, propane gas, propane air mix, air atomized #2 oil, and combination gas and oil fuel options from 2.5 to 12.5 MMBTU. Suitable for firetube and watertube boilers, the NTH series features low CO performance, a unique air damper design for easy combustion set up, as well as independent low and high fire adjustment.

## ProFire®-NTH



- Cam Trim** 14-point adjustment range available
- Parallel Positioning** available for optimal control throughout the firing range
- Center Core Gas Stabilizer** multiple staged gas injectors
- Staged Fuel** hammerhead injectors with backflow orifices
- Induced FGR** modulating valve and shutoff valve
- #2 Oil** capability for backup fuel (sizes 50–125 only)
- Panel Mount Options** include top or rear mount flexibility
- Inverted Configuration** available in lieu of standard configuration to meet space requirements
- Hinged Rear Door and Access Panels** for easy access to internal components

	Less than 15 to 9 ppm
<b>MMBTU (Gas Input)</b>	2.5 – 12.5
<b>GPH (Oil Input)</b>	35.7 – 89.3 (size 50 – 125 only)
<b>BHP (BHP = 33,475 BTU/hr)</b>	60 – 300
<b>Fuels</b>	Gas, #2 Oil, Combination





# Heavy Duty and Fuel Versatility

The ProFire®-M series burner offers: natural gas, propane gas, air-atomized #2-#6 fuel oil, and combination gas and oil fuel options from 1.4 to 10.5 MMBTU. Full modulation operation is standard for optimum performance to meet load demand. The M burner is an excellent choice when firing alternative fuels such as digester, waste oil, and biodiesel.

## ProFire®-M



**Low-pressure,** air-atomizing system on oil with rotary vane compressor

**Piston-type** positive displacement oil metering system for precise oil control

**Cam Trim** 14-point adjustment range standard on models M34-M105

**Parallel Positioning** available for optimal control throughout the firing range

**Nozzle Line Electric Heater** standard on medium to heavy oil burners

**Rotary Air Damper** for precise fuel-to-air ratios

**Hinged Air Housing** for easy access to internal components

**Gas Manifold** on oil burners standard for easy upgrade to combination units

**Combustion Air Impeller** provides adequate combustion air for various furnace pressures and high-altitude applications

**UL and cUL** listed (except ME and MEG 14-30)

	Uncontrolled Emissions
<b>MMBTU (Gas Input)</b>	1.4 – 10.5
<b>GPH (Oil Input)</b>	10 – 75 <sup>1</sup>
<b>BHP (BHP = 33,475 BTU/hr)</b>	33 – 250
<b>Fuels</b>	Gas, #2-#6 Oil, Combination

<sup>1</sup> Oil input (US GPH) calculated for #2 Oil @ 140,000 BTU/gal

# High Efficiency / Low Emissions

The ProFire®-V series burner offers: natural gas, propane gas, pressure-atomized #2 oil, and combination gas and oil fuel options from 1.3 to 16.8 MMBTU. The LNV burner, capable of less than 30 ppm NOx emissions, offers: natural gas, propane gas, pressure-atomized #2 oil, and combination gas and oil fuel options from 1.3 to 14.7 MMBTU.

## ProFire®-V



**Cam Trim** 14-point adjustment range available

**Parallel Positioning** available for optimal control throughout the firing range

**Dual-Blade Air Damper** offers precise control of combustion air flow throughout firing range

**Gas Manifold** on oil burners standard for easy upgrade to combination units

**Combustion Air Impeller** provides adequate combustion air for various furnace pressures and high-altitude applications

**Induced FGR** FGR modulating valve and shutoff valve (LNV)

**#2 Oil** capability for backup fuel

**Panel Mount Options** include top or rear mount flexibility

**Inverted Configuration** available in lieu of standard configuration to meet space requirements

**UL and cUL** listed

	Uncontrolled Emissions	Less than 30 ppm
<b>MMBTU (Gas Input)</b>	1.3 – 16.8	1.3 – 14.7
<b>GPH (Oil Input)</b>	9.3 – 120	9.3 – 105.0
<b>BHP (BHP = 33,475 BTU/hr)</b>	31 – 400	31 – 350
<b>Fuels</b>	Gas, #2 Oil, Combination	Gas, #2 Oil, Combination



# Compact Design

The standard Q Series includes on/off or modulation linkageless operation with DC pulse width modulation and offers natural gas from .375 to 2.5 MMBTU. Its totally enclosed, compact design allows provisions for sealed combustion or fresh air intake. Outside air can easily be connected to the blower inlet without any modifications to the burner.

## ProFire®-Q



**Linkageless System** standard for optimal control throughout the firing range

**DC Pulse Width Modulation** allows full blower speed control without the use of air dampers

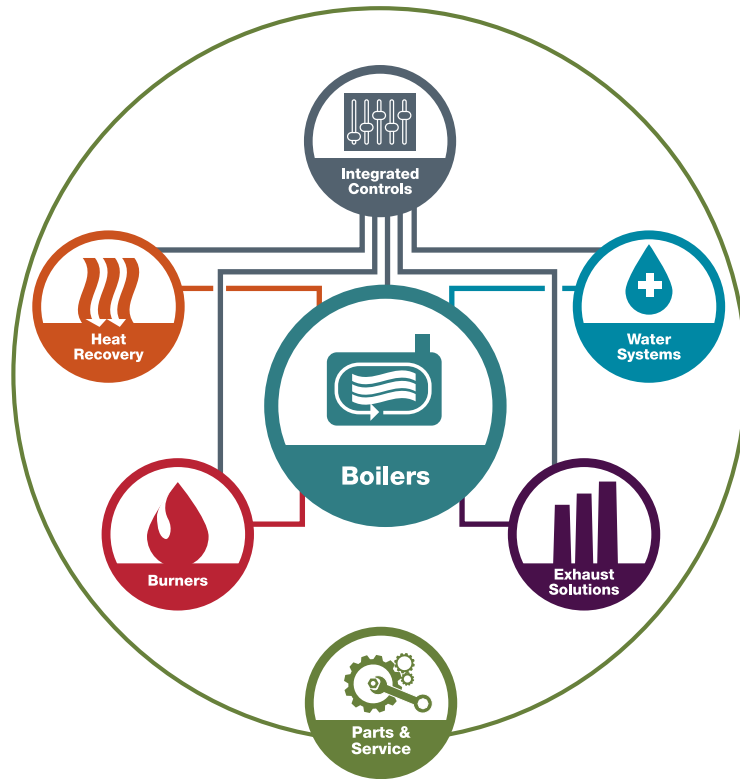
**Full Enclosed Air Housing** features a hinged cover for easy access to internal components and quiet operation

**Combustion Air Fan** efficient airfoil blade design smoothly lifts airflow over the entire blade, resulting in less motor horsepower requirements and significant noise reduction when compared to standard forced draft fans

**Sealed Combustion** eliminates the need for outside air dampers and make-up air units typically required in every boiler room.

**UL/cUL & CSA** listed

	Uncontrolled Emissions
<b>MMBTU (Gas Input)</b>	.375 – 2.5
<b>GPH (Oil Input)</b>	Not Applicable
<b>BHP (BHP = 33,475 BTU/hr)</b>	9 – 60
<b>Fuels</b>	Gas Only



## Total Integration goes far beyond burners.

For more than 80 years, Cleaver-Brooks has built a reputation for innovation in the boiler solutions industry. We remain committed to introducing technology and products that enable a more energy-efficient and environmentally friendly generation of steam and hot water.

When you come to us for a burner, you can know that each element is created to the highest standards and all will work together seamlessly to give you a highly efficient and reliable solution for protecting your boiler system. To learn more, please call or visit us online.



### Packaged Burner Systems

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