CleaverBrooks®

LC

CLEARFIRE®

CONDENSING FIRETUBE BOILER DESIGNED FOR LARGE SCALE HIGH-EFFICIENCY HYDRONIC SYSTEMS 4,000 TO 12,000 MBTU/HR

Unprecedented Power for Hydronic Applications

Cleaver-Brooks has raised the bar in condensing boilers with the ClearFire®-LC, with up to 12,000 MBTU/hr capacity. Cleaver-Brooks engineers designed the highest capacity condensing firetube boiler available. By combining our EX Technology with the ALUFER® condensing firetube, Cleaver-Brooks is able to deliver the most versatile boiler available.

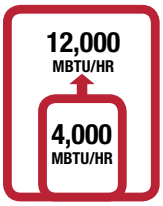
ClearFire®–LC

4,000–12,000 MBTU/hr

Features

- Full condensing with up to 99% efficiency and 5:1 turndown
- Ultra-low emissions available to 9 ppm
- No minimum return water temperature for maximum efficiency and reliability
- Dual temperature returns provide 6+% efficiency gain
- Up-front capital cost is reduced by installing fewer larger-capacity boilers versus many smaller boilers
- Fully integrated system includes boiler, burner and controls
- Built-in lead/lag control of up to eight boilers
- Ideal for primary variable flow systems

Maximum Capacity — Unparalleled Efficiency



The revolutionary ClearFire®–LC (CFLC) line provides maximum flexibility for larger facilities with enhanced efficiency. The larger capacity design allows the most effective installation by using fewer units as opposed to banks of smaller boilers, thus reducing capital cost, complexity and maintenance. With six different large capacity sizes available, starting at 4,000 up to 12,000 MBTU/hr, there's a CFLC that's right for your needs.

Flexible Solution for Condensing and Hybrid Applications

The ClearFire®–LC (CFLC) is the ideal hydronic boiler for new and retrofit opportunities to increase not only system efficiency, but reliability. When used in condensing systems, the CFLC delivers the lowest total cost of ownership and implementation. When used in a traditional non-condensing application, the CFLC eliminates the need for piping, pumping and control compromises normally required to protect non-condensing boilers. The CFLC is the perfect complement to hybrid applications, easily blending the benefits of condensing performance in applications previously considered impractical.

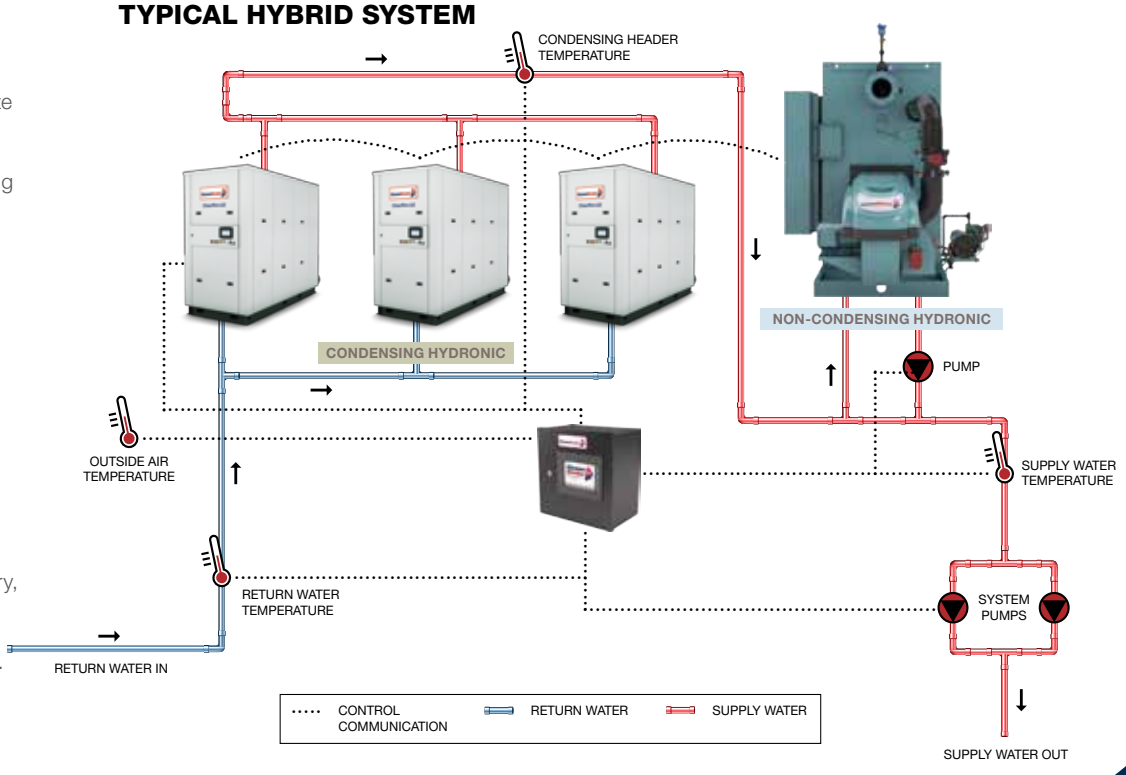
Versatile Controls Solutions

The integrated Falcon lead/lag control is uniquely suited to sequence and modulate up to eight ClearFire–LC boilers, or a combination of other Cleaver-Brooks models using the Falcon hydronic control platform, providing simplicity, flexibility and maximum system operational efficiency.

For additional versatility across multiple boiler control platforms, Cleaver-Brooks Hydronic System Control (HSC) is engineered to work with condensing, non-condensing and hybrid designs to optimize the performance and efficiency of any hydronic system. For details on how the HSC can deliver performance, flexibility and reliability to your facility, contact your local authorized Cleaver-Brooks representative at cleaverbrooks.com/reps.

The Hydronic System Control (HSC) allows facilities to maximize operating efficiency and minimize the operating cost of hydronic systems. By measuring outside air temperature along with the temperatures of the supply water, the condensing boiler's header and the return water, the HSC determines the most efficient operation of your hydronic system. The HSC uses an exclusive control strategy to determine if it is best to operate only condensing boilers, only non-condensing boilers or a combination of both in a hybrid system. The HSC can be implemented in primary-variable flow, primary-secondary, or combination pumping arrangements (as shown) for both new and existing systems.

TYPICAL HYBRID SYSTEM



The Latest Boiler Design Technology Superior Efficiency

SUPERIOR FIRETUBE TECHNOLOGY

Our upper non-condensing heat exchanger zone utilizes our exclusive EX spiral tube technology proven in our CBEX boilers. The tube design advancements allow for more heat transfer in a more compact footprint.

The condensing zone utilizes our ALUFER technology and is constructed from an inner (fireside) aluminum alloy finned surface, die-fitted within an outer duplex stainless steel tube, providing exceptional heat exchange characteristics. The corrosion-resistant properties of the ALUFER tube assure long life and reliability of the boiler.

EX SPIRAL FIRETUBE

- 85% more heat transfer than a straight tube design
- Keeps hot flue gas in turbulent flow throughout profile

ALUFER FIRETUBE

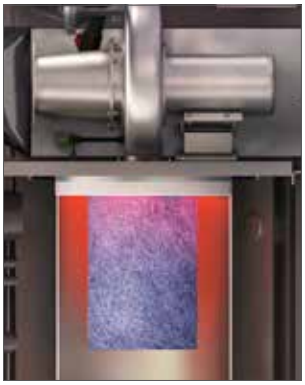
- Thermal conductivity is 10 times greater than stainless alone
- Provides the maximum effective heating surface where it is needed the most
- Heating surface up to five times larger than other condensing boilers

The ClearFire®–LC integrates Cleaver-Brooks leading heat exchanger, burner and control technologies into a large capacity condensing boiler solution. The CFLC's integrated premix burner and linkageless control work together to provide full modulation, ultra-low emissions and optimum turndown. By combining our proven extended heating surface tube designs, our patented ALUFER® tubes and exclusive EX spiral tubes in a true counter flow arrangement, the CFLC delivers the capacity, efficiency and reliability previously considered unattainable.

HEAT EXCHANGER

Every aspect of the true counter flow design is engineered to ensure the maximum effective heat transfer possible. Nobody knows firetube boilers like Cleaver-Brooks, and our proven firetube arrangement ensures reliability and longevity. The large water volume and low pressure drop inherent in our firetube design make it ideal for primary variable flow pumping applications.

MODULATING PREMIX BURNER



The modulating venturi premix burner and linkageless control automatically adjust the air/gas mixture for maximum efficiency and optimum turndown. A symmetrical, 360° even-temperature heat output is achieved from the burner, providing clean combustion with ultra-low NOx emissions of less than 20 ppm as standard and less than 9 ppm as optional.

EFFECTIVE HEAT TRANSFER INCREASE

Straight Firetube = 1.0

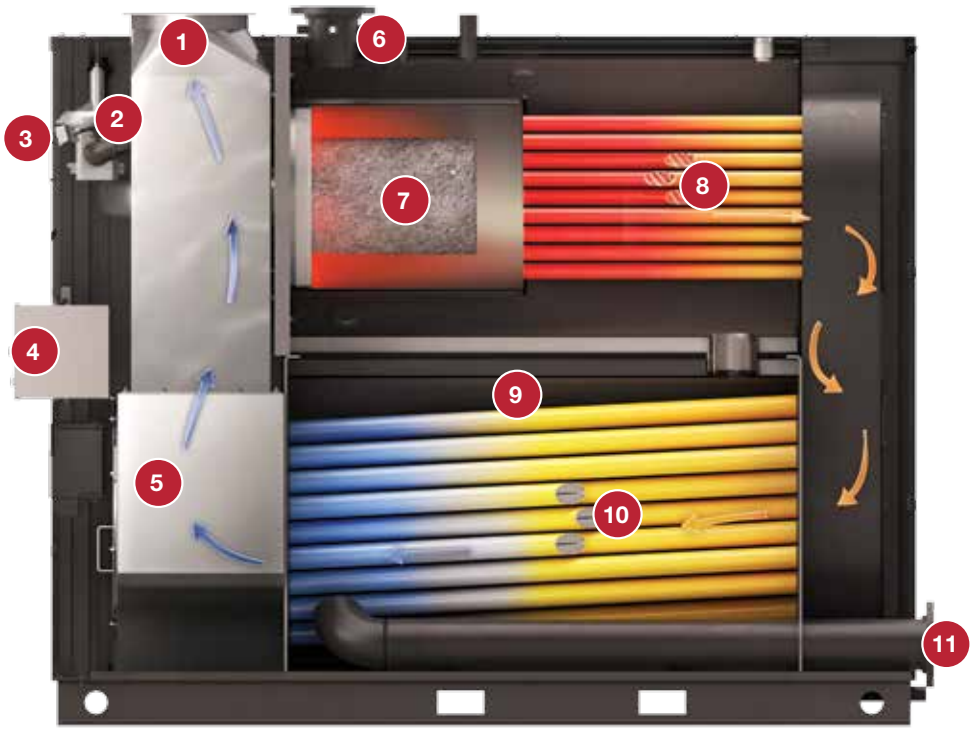
EX Spiral Tube Technology = 1.85

ALUFER Firetube Technology = 4.0

The above shows the "Relative Heat Transfer Effectiveness Coefficient." This means that just 3" of the ALUFER® firetube will transfer as much heat from the flue gas to the water as 12" of the same diameter straight firetube.

DUAL RETURN ADVANTAGE

The ClearFire®-C and ClearFire®-LC's Dual Return Advantage offers more opportunity to improve system efficiency. Most hydronic systems blend returns from different loops, compromising the performance of your condensing boiler system. The combination of our counterflow heat exchanger and ALUFER® firetube design allows you to connect a cold (less than 130°F) return to the lower inlet connection and connect the high-temperature (greater than 140°F) return to the upper inlet connection. This results in a 6%+ gain in efficiency by achieving true condensing performance even in applications with high-temperature heating loops.



Components

1. Exhaust connection
2. Premix modular venturi/ blower assembly
3. Gas train UL/CSD-1 compliant
4. User-friendly Falcon control with color touch screen interface
5. Flue and condensation collection chamber
6. Hot water supply outlet
7. Metal fiber premix burner for ultra-low NOx emissions
8. Spiral tubes with EX technology for increased heat transfer versus plain tube
9. Large water volume, ideal for primary variable flow
10. Patented ALUFER tubes for maximum condensing efficiency
11. Low- and high-temperature return connections for 6+% efficiency gain

Intelligent Integrated Controls

Coordinated control of your hydronic boiler room is the key to providing reliable operation that maximizes system efficiency. Cleaver-Brooks provides several integrated and/or stand-alone control solutions that offer the flexibility to reduce not only the fuel costs, but the total energy and maintenance costs of the system.

Integrated Falcon Control

For ease of installation and reduction of commissioning and start-up time, use the integrated Falcon control system that comes standard on every ClearFire® boiler. Falcon provides a wide range of flexibility to control up to eight boilers in a lead-lag operation. Modulate outside air dampers and control boiler pumps or isolation valves. Lead/lag control is configured to modulate only the correct number of boilers in the most efficient manner possible while eliminating short cycling.

Features

- Lead lag up to eight boilers
- Outdoor reset
- Intuitive color touchscreen interface
- Burner management
- Building Management System (BMS) interface
- Boiler Pump/Valve control
- Extensive trending and alarm diagnostics
- Damper interlock control

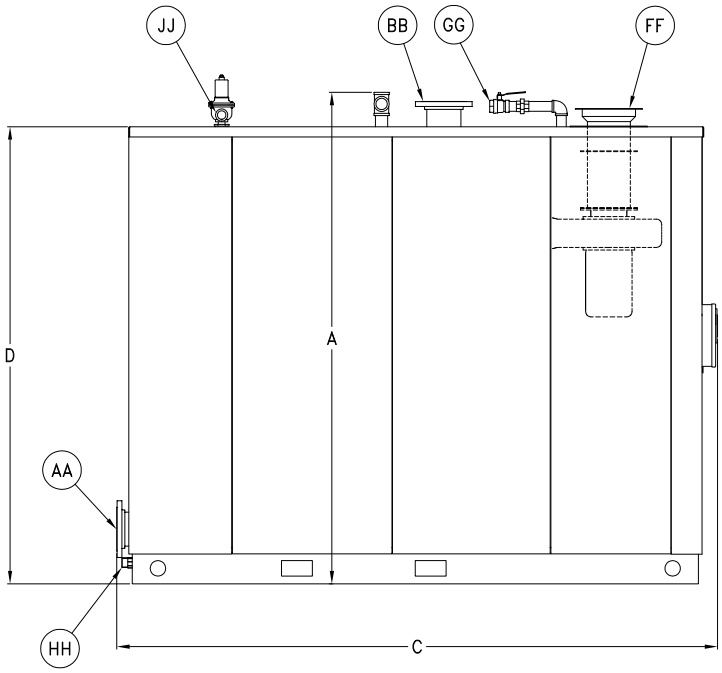
Hydronic System Control

For systems requiring a more comprehensive control strategy, look no further than Cleaver-Brooks Hydronic System Control (HSC). The HSC is an expandable, multi-faceted control solution specifically engineered to handle any type of heating system. This includes low-temperature (condensing), high-temperature (non-condensing) or hybrid systems designed to leverage the advantages of both technologies. The HSC can be applied to new or existing systems from any manufacturer's hot water boiler. The HSC is great for retrofit applications with an existing non-condensing boiler where the customer can integrate condensing technology for dramatic energy savings at a lower initial cost. It is also ideal for any customer looking for the best return on investment, including a new installation.

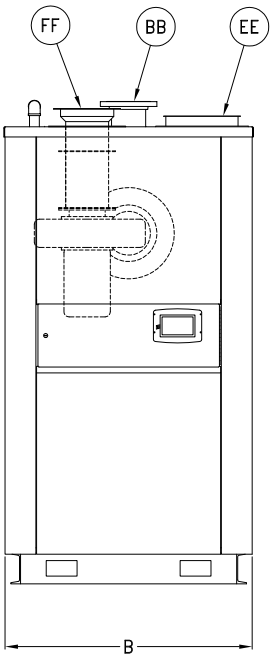
Features

- Dual Independent PID temperature setpoint control
- Alarm history and data logging
- Manages up to 20 boilers
- Outdoor reset
- Interlock dampers, draft controls and isolation valves
- Building Management System (BMS) communication interface
- Variable Speed Drive (VSD) control of system and boiler pumps
- Compatible with any manufacturer's boilers

ClearFire®–LC Boiler Dimensions and Ratings



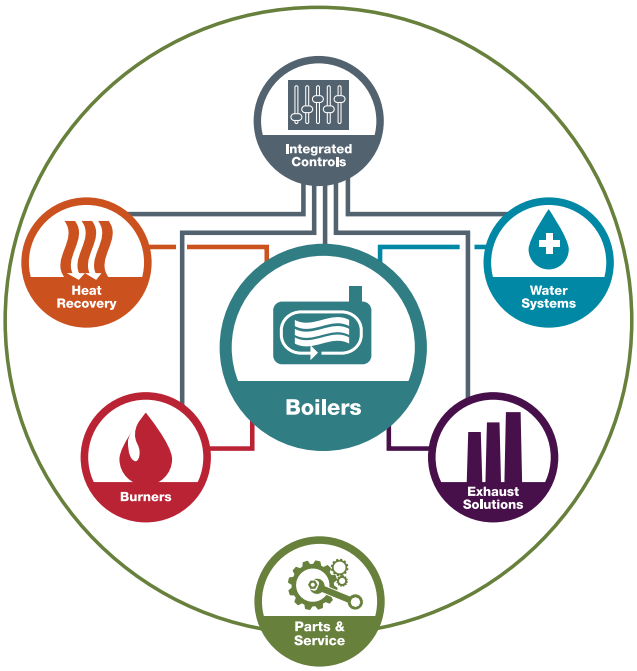
Left Side View



Front View

ITEM	DIMENSIONS (inches)	BOILER MODELS					
		CFLC-4000	CFLC-5000	CFLC-6000	CFLC-8000	CFLC-10000	CFLC-12000
	Input Max. (BTU/hr)	4,000,000	5,000,000	6,000,000	8,000,000	10,000,000	12,000,000
A	Overall Height	96”	96”	106”	106”	126”	126”
B	Overall Width	48”	48”	57.5”	57.5”	70”	70”
C	Overall Depth	118”	118”	132”	132”	148”	148 ”
D	Casing Height	89”	89”	99”	99”	119”	119”
	CONNECTIONS (inches)						
AA	Water Return, 150# RF Flg	6”	6”	6”	6”	8”	8”
BB	Water Supply, 150# RF Flg	6”	6”	6”	6”	8”	8”
EE	Flue Gas, Nominal OD	14”	14”	16”	16”	20”	20”
FF	Combustion Air (Direct Vent)	10”	10”	12”	14”	16”	16”
GG	Gas Connection, NPT	2”	2”	2.5”	2.5”	2.5”	2.5”
HH	Condensate Drain, FPT	1.25”	1.25”	1.25”	1.25”	1.5”	1.5”
JJ	Relief Valve Outlet @ 160# Setting	2”	2”	2”	2”	2”	2”
	RATINGS						
	MAWP (PSI)	160	160	160	160	160	160
	MAWT (°F)	250	250	250	250	250	250
	Weight w/o Water (Shipping) (lbs.)	7,450	7,800	9,800	10,500	15,300	16,100
	Operating Weight (lbs.)	10,743	10,918	14,460	14,760	22,562	22,928

* For detailed dimensions and ratings, go to cleaverbrooks.com/CFLC



Total Integration goes far beyond boilers.

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 condensing boiler solution, 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.

CleaverBrooks®

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