

CleaverBrooks®

ClearFire®-CE

High-Mass Condensing Firetube Boiler

500 to 6,000 MBH



A Cleaver-Brooks Sustainable Solution

Energy Savings and Environmental Benefits

The ClearFire®-CE (CFC-E) condensing boiler combines the patented TurboFer® heat exchanger technologies with innovative Ember controls and burner design to offer the most efficient condensing boiler on the market. With its proprietary combination of technologies, the CFC-E provides safe, efficient, reliable, and sustainable operation for a variety of applications.

The ClearFire-CE is future-ready and built to last with a robust design. It also helps you achieve your sustainable energy goals.

The ClearFire-CE offers:

- **Lowest total cost of ownership –** due to its large water volume, the ClearFire-CE is designed for use in variable-flow primary systems, offering the lowest total cost of ownership spanning installation through operation
- **Energy-efficient operation –** superior heat transfer and low waterside pressure drop reduces pumping energy, gas and electrical consumption
- **Environmentally conscious burner design –** offers 20 ppm NOx standard and 7 ppm NOx optional
- **Future-proof fuel flexibility –** features a burner and controls that can support renewable natural gas or a hydrogen blend without burner changes

Our CFC-E boiler meets the strict performance and sustainability criteria required to earn the Cleaver-Brooks Sustainability Seal. Find out more at cleaverbrooks.com/sustainability.

Get Future-Ready with TurboFer®

Based on the first generation of ClearFire® boilers, which have operated reliably in a variety of applications for 20+ years, the latest model boasts a patented TurboFer® heat exchanger for even greater efficiencies in a more compact footprint.

The newest ClearFire-CE can operate on renewable natural gas or a hydrogen-and-natural-gas blend of up to 20% hydrogen.

The vertical design supports more distinct temperature stratification of the heating water. Along with the integrated dual-return connection, this leads to more effective heat transfer.

UP TO 99% EFFICIENT

H_2 HYDROGEN BLEND READY



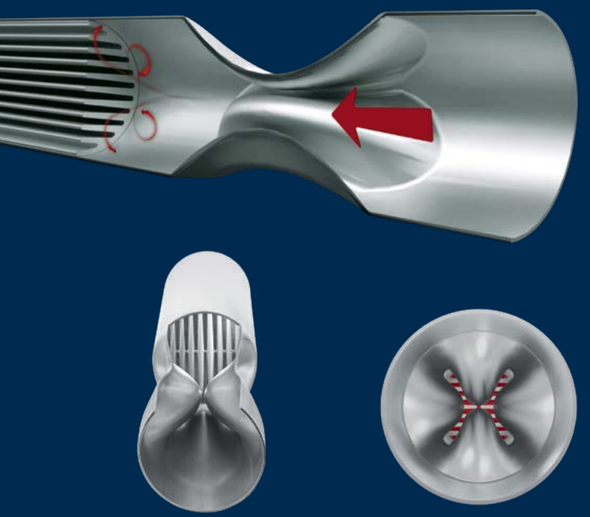
Efficiency-Gaining Features:

- TurboFer heat exchanger with optimized heat transfer leads to superior operating efficiencies, up to 99%
- 10:1 fully modulating turndown
- Duplex stainless steel construction provides corrosion resistance to flue gas condensate and chloride stress cracking
- Large-water-volume pressure vessel with low waterside pressure drop reduces pumping energy
- Integrated lead-lag controls intelligently sequence and modulate up to eight boilers

CFC-E Updates:

- Increased turndown to 10:1
- New Ember controls
- AluFer® to TurboFer technology
- Enhanced casing design

Engineering Innovation Boosts Efficiency



The TurboFer® heat exchanger is a newly engineered, patented core component of the boiler. The unique design of the heat exchanger and its innovative technology generates turbulence on the fireside, increasing heat transfer and boosting efficiency. Combined with the other innovations, this reduces your initial investment and ongoing operating costs.

Heat Transfer Done Right

The TurboFer design starts with a duplex stainless steel tube die-fitted with an inner (fireside) aluminum-alloy finned heating surface. The top of the tube is then pressed together producing a smaller cross-sectional area that increases flue gas velocity and turbulence. The flue gases speed up, creating a swirling effect, which leads to superior heat transfer in a compact footprint.

Technology Enhancements

The firetube technology provides unmatched heat transfer and condensing characteristics and delivers excellent waterside corrosion resistance while keeping water treatment requirements simplified.

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

6%+ Increase in Efficiency

The ClearFire®-CE features two separate returns: the high-temperature return at the upper inlet connection and the low-temperature return at the lower inlet connection. This strengthens counterflow heat exchange characteristics, resulting in increased condensing performance.

The dual-return design of the ClearFire-CE helps it achieve optimal condensing performance, even in applications with non-condensing temperature heating loops, resulting in 6%+ increases in system efficiency.



Industry-Leading Non-Prorated Warranties

- Lifetime thermal shock
- 15-year fireside corrosion
- 5-year burner canister
- 20-year condensate collection pan
- 2-year parts warranty

Advanced Burner & Controls

Inherent O_2 Trim

The CFC-E uses a variable-speed ECM combustion air fan, reducing electrical consumption.

This design allows for true linear modulation and standard ultra-low emissions with premix combustion.

ClearFire® boilers utilize a gas valve/venturi that automatically adjusts for changes in combustion air density. This maintains consistent excess air levels from low-to-high fire without additional controls that require tuning and maintenance, meaning fewer service visits to maintain peak efficiency.





Integrated Ember Controls

The CFC-E features an integrated Ember control platform that has the built-in ability to control lead-lag, outside air temperature reset, automatic isolation valves, primary pumps, and BAS integration, enabling seamless design and functionality.

The controls have redundant host functionality. BACnet is included as standard, and true ΔT pump speed control means there are many built-in features to support different system requirements.

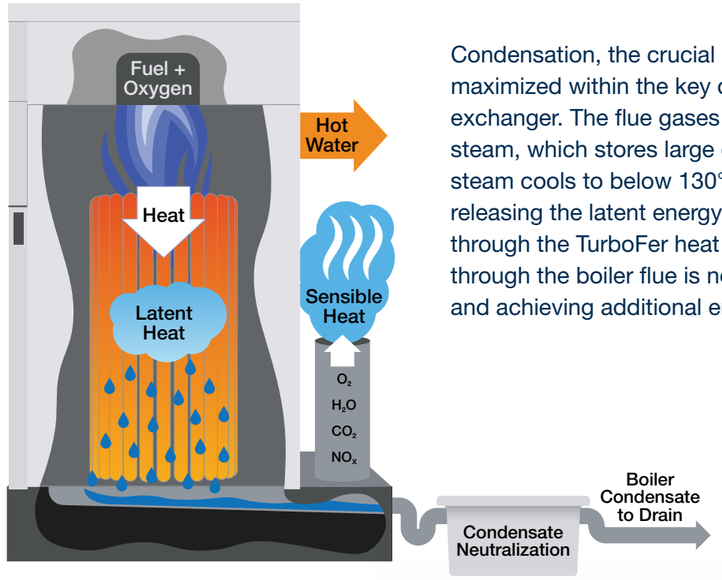
Improved Turndown

All capacities of the ClearFire®-CE now feature 10:1 fully modulating turndown. This turndown is achieved with the boiler operating efficiently across the entire firing range by keeping excess air levels consistent. Additionally, minimal moving parts simplifies maintenance and provides repeatable combustion performance.

The increased turndown helps the boilers match the load demand more closely, leading to increased system efficiencies as well as reduced boiler cycling and wear-and-tear on the burner components.



Condense for Maximum Efficiency



Condensation, the crucial element to improving efficiency, is maximized within the key design features of the TurboFer® heat exchanger. The flue gases from the combustion process contain steam, which stores large quantities of latent energy. When the steam cools to below 130° F, it becomes liquid, condensing and releasing the latent energy and transferring the heat to the water through the TurboFer heat exchanger. Energy otherwise lost through the boiler flue is now retained, increasing efficiencies and achieving additional energy savings of approximately 15%.

15%
INCREASED ENERGY SAVINGS

Meeting Your Needs



Skid Systems

Cleaver-Brooks pre-engineered and pre-packaged, skid-mounted hydronic boiler solutions offer a simple solution to get up and running in less time, with less effort than traditional field-installed systems. Single-point piping and electrical connections, and robust skid design make installation simple and easy.

Outdoor Boiler

Cleaver-Brooks offers a UL-listed and AHRI-certified outdoor option for the ClearFire®-CE boiler that allows the boilers to be installed outdoors in moderate climates. The outdoor hood kit allows for simple installation and mounts directly onto all current ClearFire-CE boilers.



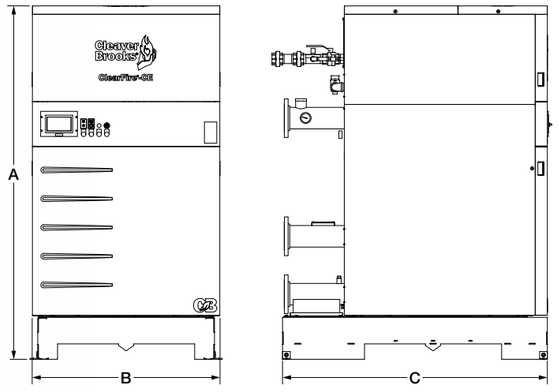


HxO Heat Exchanger

The HxO is designed to provide instantaneous domestic hot water supply to your building without the need for additional fuel-fired or electric heating equipment. By utilizing your new or existing hot water heating loop, the HxO will provide on-demand water for your system.

ClearFire®-CE Dimensions and Ratings



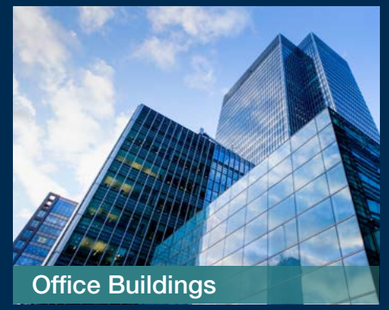


	500	750	1000	1500	2000	2500	3000	3500	4000	5000	6000
Overall Height (“A” - inch)	78.0	78.0	78.0	79.8	79.8	95.2	95.2	91.3	91.3	93.6	93.6
Overall Width (“B” - inch)	32.6	32.6	32.6	35.7	35.7	35.7	35.7	48.4	48.4	58.7	58.7
Overall Depth (“C” - inch)	49.4	49.4	49.4	56.0	56.0	56.0	56.0	68.4	68.4	80.6	80.6
Dry Weight (lb)	1,298	1,298	1,396	1,861	2,041	2,420	2,475	3,575	3,575	4,900	5,275
Shipping Weight (lb)	1,413	1,413	1,511	1,986	2,166	2,541	2,596	3,725	3,725	5,075	5,450
Operating Weight (lb)	2,065	2,065	2,113	2,778	2,858	3,470	3,492	5,227	5,304	7,502	7,659
Water Volume (gallon)	92	92	86	110	98	126	122	198	198	312	285

Broad Range of Applications

The ClearFire®-CE is capable of variable-flow pumping, allowing for maximum operating efficiency in a variety of system applications.

- Office Buildings
- Schools, Colleges & Universities
- Healthcare Facilities
- Multi-Family Housing
- Building Heating
- Manufacturing Processes


Office Buildings


Healthcare Facilities


Manufacturing Processes


Campus Systems


Multi-Family Housing



The power of total integration.

The **Power of Total Integration** is how Cleaver-Brooks delivers the world's broadest range of integrated, sustainable thermal solutions. In addition to our products, this includes Cleaver-Brooks global authorized sales representatives and independent service contractors, training resources, and trusted expertise that add significant value to your Cleaver-Brooks investment.

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