



# H

## **CLEARFIRE®**

High-efficiency, modular steam boiler  
10-60 HP

# High-Efficiency, Low-Emission Steam Boiler in a Compact Footprint

The ClearFire®-H compact, gas-fired horizontal boiler is designed specifically for the requirements of the light industrial and commercial markets and is available in sizes ranging from 10-60 horsepower for 15# or 150# psig steam pressure.

## ClearFire-H

10-60 HP

### Features

**Maximum fuel savings** with ALUFER® firetubes, full burner modulation and high turndown via variable speed blower

**High efficiency**, guaranteed up to 85% reducing greenhouse gas emissions

**Easily tuned**, self-regulating, premix burner

**Reliable operation**, no dampers or linkages

**Advanced combustion design** eliminates need for flue gas recirculation and provides low emissions (<20 ppm NOx and <10 ppm CO)

**ModBus (RS485) communications** with multiple protocol gateway solutions available

**Ultra-quiet operation** less than 70 dBA

**Reduced electrical energy consumption** with ECM variable speed blower

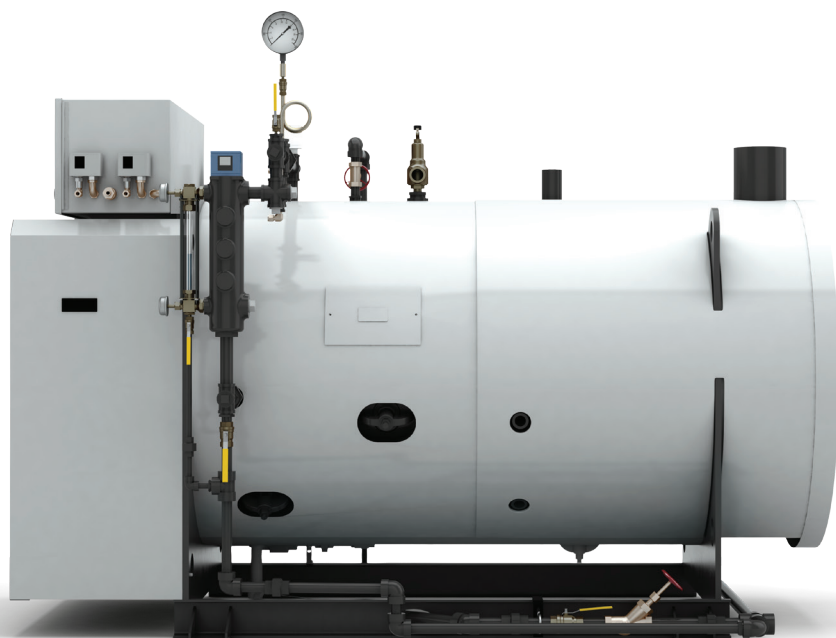
**Low gas supply** pressure (less than 14" w.c.)

**cULus listed** (natural gas & propane)

**Controls** are ASME CSD-1 Compliant

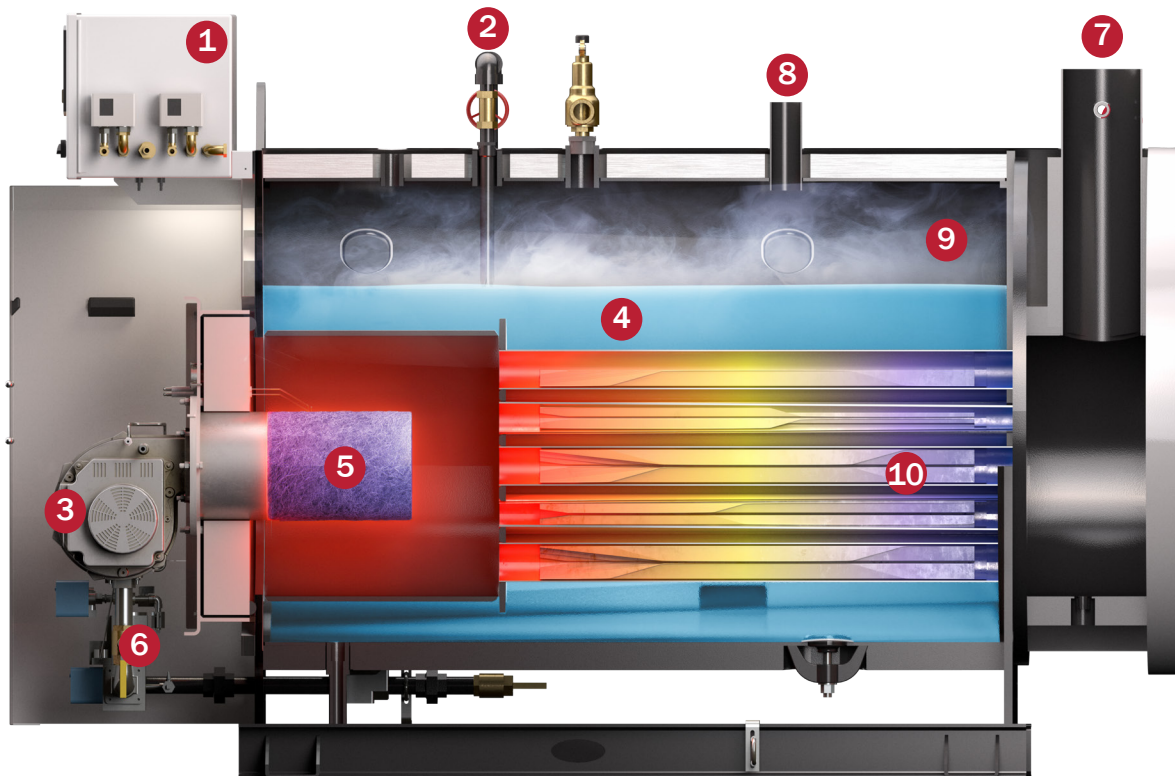
**15# & 150# designs** deliver superior steam quality

**Dual fuel option:** natural gas/propane



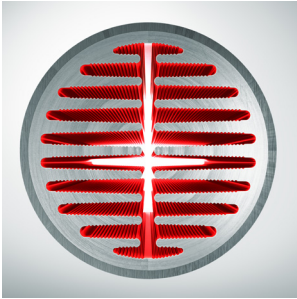
# The ClearFire®-H Advantage

- 1 Single-point connection for electrical and controls
- 2 Surface blowoff: automatic conductivity control available
- 3 Modulating low-NOx burner assembly for maximum operating efficiency
- 4 Single-pass firetube design, thermal shock-resistant
- 5 Fiber mesh burner designed to premix air and fuel for optimal combustion
- 6 CSD-1, XL GAP gas train
- 7 Small stack outlet
- 8 Steam outlet, sized for the application
- 9 Large steam volume, better steam quality
- 10 Patented ALUFER® tubes for increased heat transfer



# Optimize Your Steam System

## Patented ALUFER® Heat Transfer Technology



Patented ALUFER Tubes

The internationally patented ALUFER firetube is the technology behind the advanced heat transfer design. The tube is constructed from an inner (fireside) aluminum alloy finned surface, die-fitted within an outer steel tube, providing exceptional heat exchange characteristics.

- Thermal conductivity of the ALUFER insert is significantly greater than that of carbon steel.
- Internal finned surface of the ALUFER tube enlarges the heat exchange surface area three-fold.
- Inner surface of the tube is divided into 10 flow channels to enhance turbulence and maximize heat transfer.

## Heat Exchanger And Burner

The ClearFire®-H boiler has a high-quality, steel combustion chamber with ALUFER firetubes. The single-pass horizontal arrangement ensures maximum heat exchanger effectiveness and superior steam quality. The high-turndown modulating burner minimizes short cycling and allows the boiler to operate at peak efficiency.

## Thermal Shock Resistance

The single-pass arrangement is designed to inherently minimize thermal stress in the heat exchanger.

## Premix Modulating Burner Operation

The premix burner controls automatically adjust the air and gas mixture to the correct proportions before it enters the burner. A symmetrical, 360° even-temperature heat output is achieved from the burner, providing clean combustion with low NOx emissions. Turndown is up to 5:1 with emissions of less than 20 ppm.

## Burner Gas Train

Standard components meet the requirements of cULus, ASME CSD-1, XL-GAP and FM.

- Low gas pressure manual reset
- High gas pressure manual reset
- CSD-1 test cocks
- Manual test valve
- Dual safety shutoff valve
- Gas pressure regulator

Gas train is factory piped and wired on the burner.

## Boiler Trim and Controls

Boiler trim is in accordance with cULus and ASME CSD-1.

- High limit pressure control
  - manual reset
- Operating limit pressure control
- Combustion air proving switch
- Primary LWCO and pump control
- Manual reset ALWCO
- ASME safety relief valve set (15 psig or 150 psig)

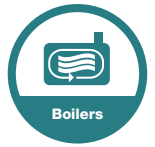
## Reliable Steam

- Greater than 99% steam quality down to as low as 6 psig
- Guaranteed up to 85% fuel to steam efficiencies

## ClearFire®-H Options

- Blowdown and feedwater valve assemblies
- Surface blow-off controls
- Chemical feed tank
- Packaged feedwater system
- Feedwater economizer
- High-pressure regulator
- Lead-lag header pressure
- Reusable air filter
- Direct vent combustion provision for reduced make-up air requirement
- Building EMS communication interface solutions
- Pre-fabricated exhaust solutions

# Intelligent Integrated Controls



The Cleaver-Brooks Falcon steam controller is a proven boiler/burner management control that provides an intuitive operator interface featuring integrated burner sequencing, trending, flame safety, modulation, alarms, lockout and much more, ensuring your boiler system operates at peak efficiency, while providing necessary safety and reliability.

The Cleaver-Brooks Falcon control with integrated lead/lag optimizes the boiler room's operational efficiency while delivering precise steam load control to meet heating and process demands. The Cleaver-Brooks Falcon can communicate with your building's Energy Management System (EMS), which helps maximize overall system efficiency.



**User-friendly Controls**

- Touch screen graphics
- PID set point control (single boiler and lead lag)
- Configurable lead lag control up to eight boilers
- Comprehensive diagnostics/fault history
- Combustion air/draft control interlock
- Night setback
- Hot standby
- ModBus (RS485) Communications
  - multiple protocol gateway solutions available



## The ClearFire®-H is the ideal boiler for both heating and process steam applications.

The Falcon lead/lag control is uniquely capable of optimizing the ClearFire-H's combustion and thermal performance characteristics to sequence and modulate ClearFire-H boilers to maximize steam plant efficiency. The Cleaver-Brooks Falcon lead/lag control uses the common base load firing rate method to sequence and modulate a multiple-boiler system. This approach optimizes the boilers' operating efficiency while minimizing energy-wasting short cycling. The elimination of short cycling minimizes purge and standby losses, while extending the life and reliability of your boiler system.



# Single Source Skid Package Solutions

Looking for an engineered steam solution? Cleaver-Brooks offers standard and complete steam boiler system skid mounted packages in gas and propane fuels. The package includes the steam boiler, feed system and blowdown separator with optional chemical feed system and water softener. This complete package saves you time installing the system as all that is required is a single-power, gas, steam and water connection.

## Features

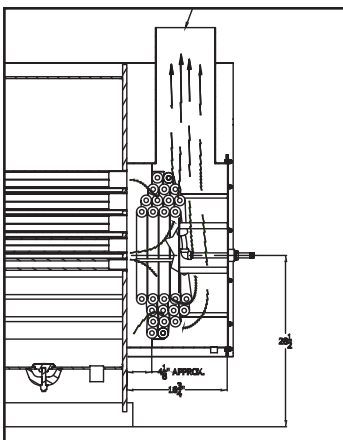
- Single-source responsibility
- Plug and Play, reduced installation cost
- Standard and customized skid solutions to meet your needs
- Eliminate field piping and wiring errors



## Maximize Efficiency to 87% with an Economizer

The ECF ClearFire® economizer is a stainless steel coil tube arrangement using extended heating surface fins to maximize heat transfer. Flue gas from the boiler passes over the coiled tube, which conveys incoming feedwater. Feedwater preheated in this fashion reduces the need for a steam feedwater heater, resulting in efficiencies of up to 87% in non-condensing applications.

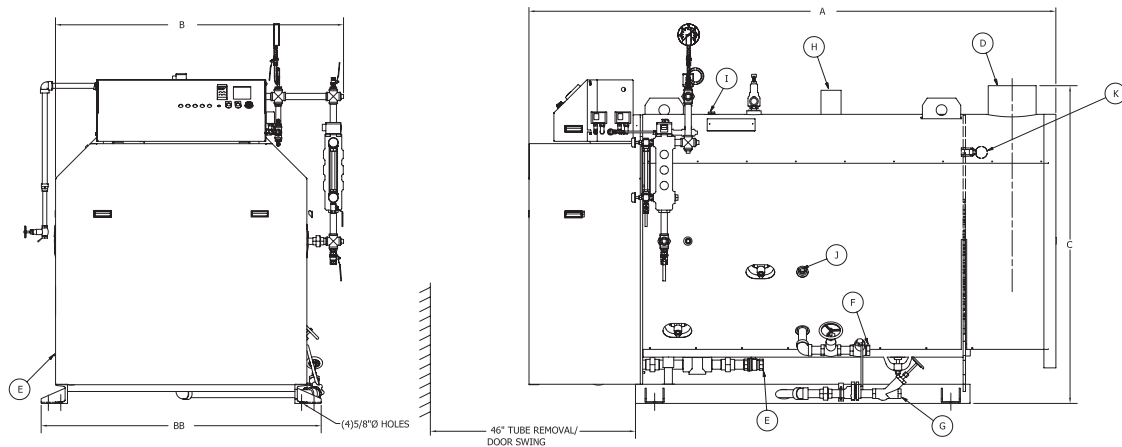
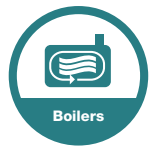
### Integral CFH Economizer



### External Economizer



# ClearFire®-H Boiler Dimensions and Ratings



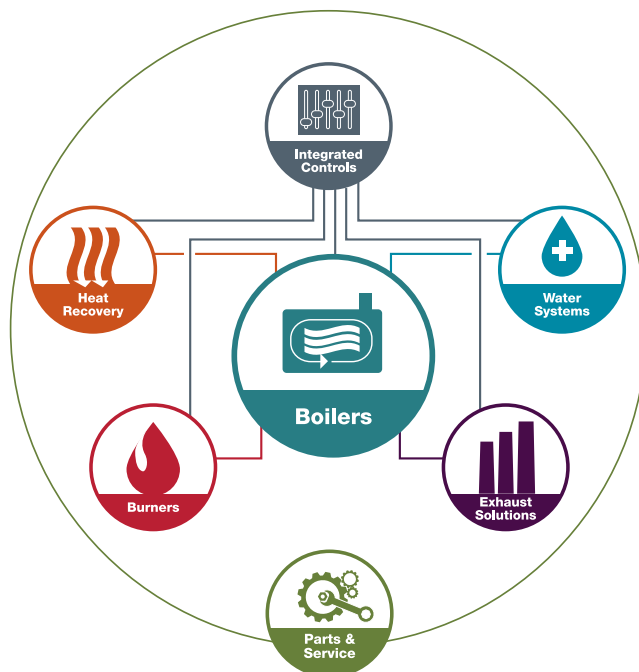
Boiler Horsepower	10	15	20	25	30	40	50	60
<b>Dimensions – inches</b>								
Overall Length (A)	86	86	87	87	91.5	104	110	110
Overall Width (B)	43.5	43.5	47	47	56	56	60	60
Width (BB) minus water column and blowdown	38	38	41.5	41.5	49	49	55	55
Overall Height (C)	54	54	57	57	65.5	65.5	69	69
<b>Connections - inches</b>								
Stack Nominal OD (D)	6	6	6	6	8	8	10	10
Gas Connection (E)	1	1	1	1	1 1/4	1 1/4	1 1/2	1 1/2
Feedwater (F)	1	1	1	1	1	1	1 1/4	1 1/4
Bottom Blowdown (G)	1	1	1	1	1	1	1 1/4	1 1/4
Steam Outlet (H) 15# ST.	4	4	4	4	4	6	6	6
Steam Outlet (H) 150# ST.	1 1/2	1 1/2	2	2	2	2	3	3
Surface Blowoff (I)	1	1	1	1	1	1	1	1
Chemical Feed (J)	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Overflow (K)	1	1	1	1	1	1	1	1
<b>Steam Boiler Weights in lbs</b>								
Normal Water Weight - 15#	920	920	1,150	1,150	1,710	1,980	2,510	2,510
Normal Water Weight - 150#	1,010	1,010	1,250	1,250	1,850	2,150	2,700	2,700
Approx Shipping Weight	2,450	2,450	2,750	2,750	3,400	3,700	5,200	5,200
<b>Power Requirements (115VAC, 60 Hz, single phase)</b>								
Blower Motor Size (Watts)*	335	335	335	335	335	750	1,200	1,200
<b>Ratings</b>								
ASME Rated Capacity - Steam (lbs-steam/hr from & at 212°F) - Steam Safety Relief Valve Sizing**	345	518	690	863	1,035	1,380	1,725	2,070
ASME Rated Capacity - Steam (kg-steam/hr from & at 100°C) - Steam Safety Relief Valve Sizing**	156	235	313	391	469	626	782	939
Rated Capacity - Steam (lbs-steam/hr at 6# operating pressure)	338	507	676	845	1,014	1,352	1,690	2,028
Rated Capacity - Steam (kg-steam/hr at 41.4 kPa)	153	230	307	383	460	613	767	920
Fireside Heating Surface (sq.ft.)	122	122	191	191	310	381	573	573
Turndown/Modulating Firing Range	4:1	4:1	4:1	4:1	4:1	5:1	5:1	5:1

## Notes:

\*For altitudes above 1,500 ft., contact local Cleaver-Brooks authorized representative for verification of boiler and blower motor size.

\*\*ASME ratings from 0 psig and at 212° - for safety relief valve sizing





## 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 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.



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