# HIGH EFFICIENCY, COMPACT

## CLEARFIRE®-C COMMERCIAL CONDENSING BOILER


**ClearFire® - C**

Six sizes, 500 - 2,500 MBH

# CLEARFIRE BOILERS

## The C-B Commercial ClearFire condensing boiler offers high efficiency/low NOx technology

and as such satisfies demands for economy and environmental protection. It features the C-B ClearFire combustion system with pre-mix down firing burner. This advanced burner is fundamental to the boiler achieving efficiencies up to 99% and NOx levels to less than 20 PPM. The pre-mix burner is suitable for use with either natural or propane gas. Clearfire condensing boilers are available in 6 sizes with maximum inputs between 500 mmbtu and 2500 mmbtu. They are suitable for central heating and indirect hot water supply for working pressures up to 125 psig depending on the output required.

## Key Design features:

- Modulating pre-mix burner with 5:1 turndown
- Single pass stainless steel combustion chamber and tube sheet
- 2-5% potential energy savings with dual temperature return
- Optonal Dual gas train for critical back-up fuel source
- cULus listed for natural and propane gas
- AluFer® tube heat exchanger
- Fresh air inlet connection for sealed combustion
- Thermal shock resistance
- Low hydraulic resistance
- Waterside inspection
- No minimum temperature requirement
- Easy access hinged burner boiler lid to aid burner servicing
- Low NOx at < 20 PPM (SCAQMD precertified)
- Low noise < 70 dBA at 3 feet

# CONTROLS & BURNER

## C-B Falcon Control

The C-B Falcon is a total boiler control that provides the integrated functionality needed to efficiently and economically operate your boiler system, while providing necessary safety and reliability.

- Touch screen graphics with trending
- Three configurable relays (pump/valve)
- Post shutdown pump delay
- Outdoor temperature reset
- Supply & return water sensor
- High limit cut-out with manual reset
- Integrated Burner sequencing, alarming and lockout
- Date/time stamping of lockouts and alerts
- First out expanded annunciation, firing rate limiting, time of day (setback) and PID loops.
- ModBus (RS485) Communications
- Frost diagnostics
- Modulation VSD combustion control
- UL Recognized


**User-friendly Touch Screen Graphics**

# ENHANCED EFFICIENCY

## Enhanced efficiency with single pass condensing heat exchanger

The single pass stainless steel ClearFire boiler has a premix burner downfiring into a vertical water surrounded tube nest made up of high efficiency AluFer® tubes.

The extended heating surface and corrosion resistant properties of the AluFer® tube ensure enhancing heat transfer and peak condensing performance.

Downfire arrangement enhances condensate removal, which collects into an engineered plastic steel lined reservoir at the base of the boiler. (A trap is required to allow condensate to run by gravity to drain).

A condensate neutralization reservoir can be supplied as an optional extra, if required by local ordinances.

## AluFer® Tubes — the formula for maximum condensation

The internationally patented AluFer® tube is the latest innovation in advanced heat transfer technology.

The tube is constructed from an inner (fireside) aluminum alloy finned surface, die fitted within an outer stainless steel tube providing exceptional heat exchange characteristics.

The efficiency of the heat transfer is attributable to the following factors:

- *Heat conductivity of the Alufer® insert is ten times greater than that of carbon steel.*
- *Internal finned surface of the Alufer® tube enlarges the heat exchange surface fivefold.*
- *Inner surface of the tube is divided into eight flow channels to create maximum turbulence and heat transfer.*

## Construction

The ClearFire boiler has a high quality stainless steel combustion chamber with a single pass Alu Fer® tubes made of stainless steel with aluminum alloy finned internal surface (fireside). The insulated boiler is encased within powder coated steel panels. Access to the burner and heat exchanger for maintenance is via a hinged cover.

# COMBUSTION CONTROL

## Premix modulating burner operation

The premix burner controls automatically adjust the air/gas mixture to the correct proportions before it enters the burner.

A symmetrical 360° even temperature heat output is achieved from the burner, giving consistent high efficiency combustion with low NOx emissions. Turndown is 5:1 with standard emissions of < 20 ppm.

## Burner Gas Train

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

- *Low Gas Pressure manual reset.*
- *High Gas Pressure manual reset.*
- *CSD-1 Test Cocks*
- *Manual Test Valve*
- *Dual Safety Shutoff Valve*
- *Optional dual gas train (natural and propane gas)*

Gas Train is factory piped and wired on the burner. Gas supply connection should be made at the rear of the boiler and include a drip leg.

## Boiler Trim and Controls

Boiler trim is in accordance with cUL and ASME CSD-1 which includes:

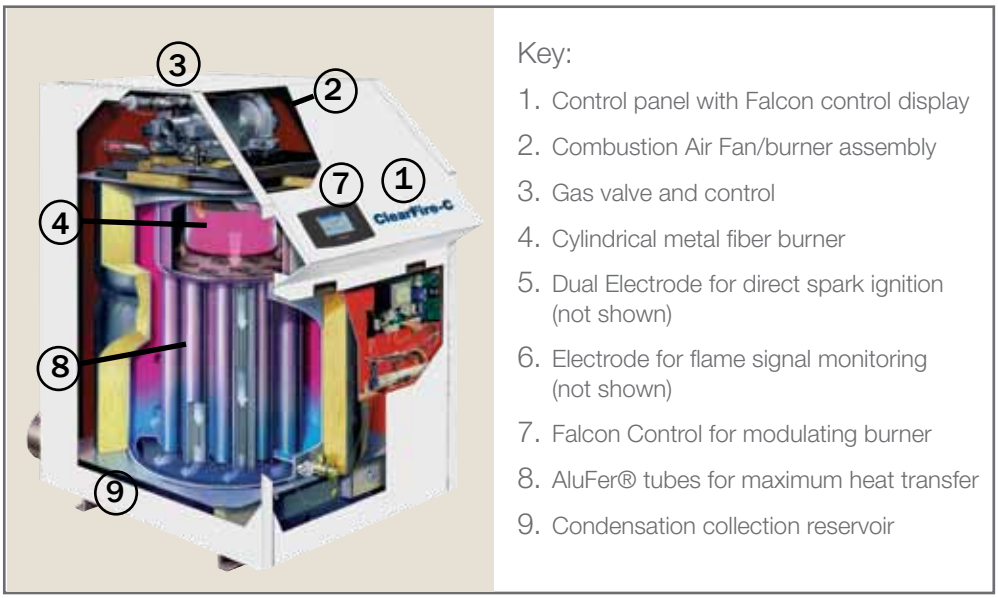
- *High Limit Temperature Control — Manual Reset*
- *Combustion Air Proving Switch*
- *High Air Pressure Switch*
- *Manual Reset Probe Type Low Water Cutoff*
- *ASME Safety Relief Valve set @ 125 psig (60 psig optional).*

## Quality Assurance

Each ClearFire Boiler is manufactured in accordance with ASME Section IV requirements and appropriately stamped. Manufacturing process is according to ISO 9001 standards to ensure the highest quality standards are built into each boiler. The complete package is cUL certified, listed, and labeled.

## Warranty

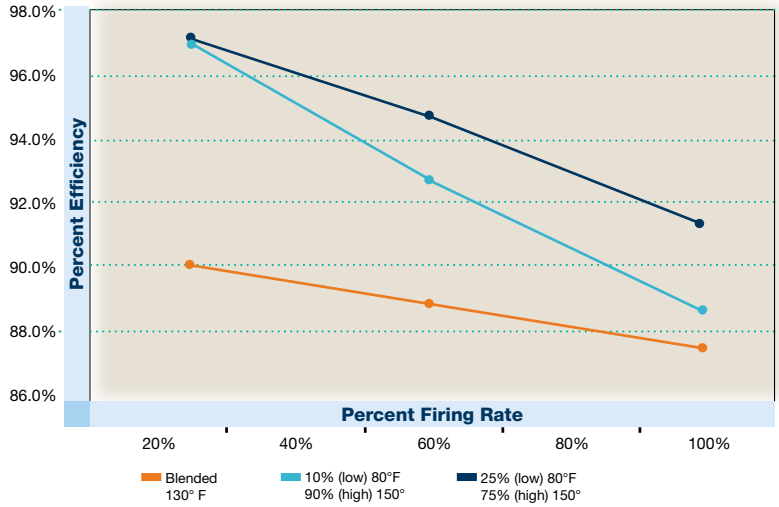
In addition to the standard warranty, the pressure vessel is warranted for 20 years against thermal shock and 10 years against fireside condensation corrosion. The burner cannister is warranted for 5 years.



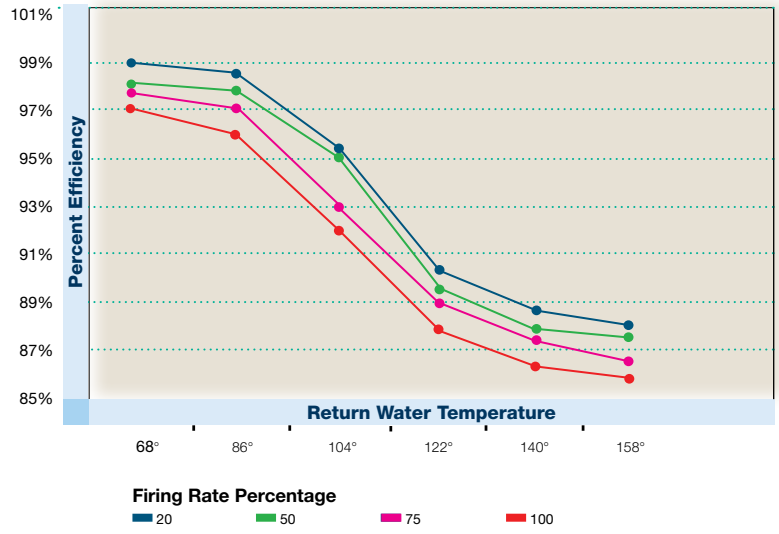

Key:

1. Control panel with Falcon control display
2. Combustion Air Fan/burner assembly
3. Gas valve and control
4. Cylindrical metal fiber burner
5. Dual Electrode for direct spark ignition (not shown)
6. Electrode for flame signal monitoring (not shown)
7. Falcon Control for modulating burner
8. AluFer® tubes for maximum heat transfer
9. Condensation collection reservoir

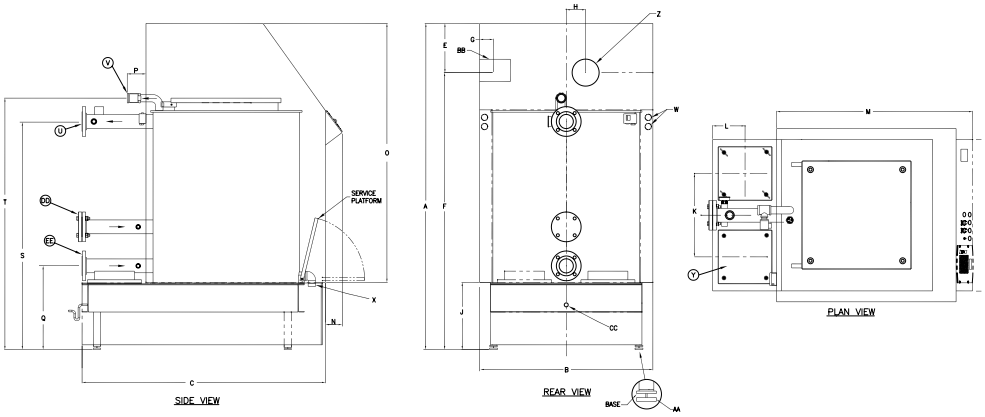
### Dual Return High Efficiency as a function of Low Temperature Return Flow Percentage.



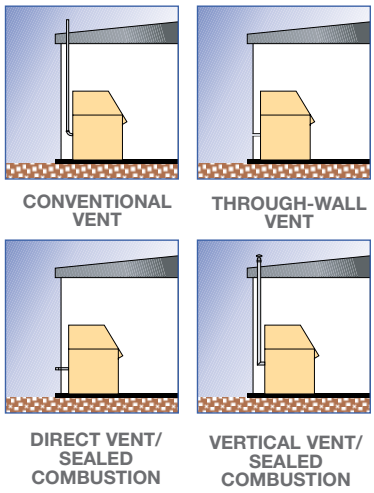

### Single Return Efficiency as a function of Temperature



## DIMENSIONS AND RATINGS




## VENTING OPTIONS



CONVENTIONAL VENT

THROUGH-WALL VENT

DIRECT VENT/ SEALED COMBUSTION

VERTICAL VENT/ SEALED COMBUSTION

| ITEM | DIMENSIONS | BOILER SIZE | | | | | |
|---|---|---|---|---|---|---|---|
| | | 500 | 750 | 1000 | 1500 | 1800 | 2500 |
| A | OVERALL HEIGHT | 71.9" | 71.9" | 75.4" | 81.5" | 81.5" | 81.9" |
| B | OVERALL WIDTH | 32.3" | 32.3" | 36.6" | 43.7" | 43.7" | 50.8" |
| C | OVERALL DEPTH | 48.9" | 48.9" | 64.0" | 65.6" | 65.6" | 72.3" |
| D | WIDTH LESS CASING | 26.8" | 26.8" | 31.1" | 38.2" | 38.2" | 45.3" |
| E | GAS CONNECTION TO TOP OF CASING | 7.8" | 7.8" | 9.2" | 9.5" | 9.5" | 9.4" |
| F | GAS CONNECTION TO FLOOR | 64.1" | 64.1" | 66.2" | 72" | 72" | 72.5" |
| G | SIDE OF CASING TO GAS CONNECTION | 2.5" | 2.5" | 3.8" | 4.9" | 4.3" | 5.2" |
| H | BOILER CENTERLINE TO AIR INLET | 4.3" | 4.3" | 3.9" | 7.0" | 7.0" | 7.0" |
| J | FLOOR TO TOP OF STACK CONNECTION | 18.6" | 18.6" | 18.1" | 19.1" | 19.1" | 20.9" |
| K | CENTERLINE TO CENTERLINE OF STACK STUB | 15.4" | 15.4" | 16.9" | 21.0" | 21.0" | 28.1" |
| L | REAR OF BOILER TO CENTERLINE OF STACK STUB | 5.4" | 5.4" | 7.5" | 8.1" | 8.1" | 8.6" |
| M | FRONT OF BOILER TO REAR OF CASING | 38.8" | 38.8" | 49.6" | 49.4" | 49.4" | 56.5" |
| N | CONTROL PANEL PROJECTION | 4.1" | 4.1" | 4.1" | 4.1" | 4.1" | 4.1" |
| O | CASING HEIGHT | 56.2" | 56.2" | 60" | 65.4" | 65.4" | 65.4" |
| P | AIR VENT LINE PROJECTION | 7.8" | 7.8" | 7.3" | 8.1" | 8.1" | 8.7" |
| Q | FLOOR TO CENTERLINE OF RETURN CONNECTION | 19.3" | 19.3" | 19.3" | 20.3" | 21.1" | 21.9" |
| S | FLOOR TO CENTERLINE OF SUPPLY CONNECTION | 54.3" | 54.3" | 55.9" | 56.7" | 56" | 56.8" |
| T | FLOOR TO CENTERLINE OF AIR VENT | 59.9" | 59.9" | 62" | 62.9" | 62.9" | 64.8" |
| AA | BOILER ADJUSTMENT FOOT HEIGHT | 2.5" | 2.5" | 2.5" | 2.5" | 2.5" | 2.5" |
| AB | HEIGHT ABOVE BOILER FOR BURNER SERVICE | 14" | 14" | 14" | 14" | 14" | 14" |
| | **CONNECTIONS** | | | | | | |
| U | WATER SUPPLY, 150 RF FLG | 2 1/2" | 2 1/2" | 2 1/2" | 3" | 4" | 5" |
| V | BOILER AIR VENT, NPT | 1 1/2" | 1 1/2" | 1 1/2" | 1 1/2" | 1 1/2" | 1 1/2" |
| W | ELECTRICAL CONDUIT, LEFT OR RIGHT | 1.6" | 1.6" | 1.6" | 1.6" | 1.6" | 1.6" |
| X | BOILER DRAIN, NPT | 1 1/2" | 1 1/2" | 1 1/2" | 1 1/2" | 1 1/2" | 1 1/2" |
| Y | FLUE GAS NOMINAL OD, LEFT OR RIGHT OPTION | 6" | 6" | 8" | 10" | 12" | 12" |
| Z | COMBUSTION AIR OPTION | 4" | 4" | 6" | 6" | 6" | 8" |
| BB | GAS CONNECTION, NPT | 1" | 1" | 1" | 1 1/2" | 1 1/2" | 1 1/2" |
| CC | CONDENSATE DRAIN, NPT | 3/4" | 3/4" | 3/4" | 3/4" | 3/4" | 1" |
| DD | WATER RETURN (UPPER) RF FLANGE | 2 1/2" | 2 1/2" | 2 1/2" | 3" | 4" | 5" |
| EE | WATER RETURN (LOWER) RF FLANGE | 2 1/2" | 2 1/2" | 2 1/2" | 3" | 4" | 5" |
| | RELIEF VALVE @ 60# SETTING | 1" | 1" | 1" | 1" | 1 1/2" | 1 1/2" |
| | VOLTAGE FAN MOTOR | 115/1/60 | 115/1/60 | 115/1/60 | 115/1/60 | 115/1/60 | 115/1/60 |
| | VOLTAGE CONTROL CIRCUIT | 115/1/60 | 115/1/60 | 115/1/60 | 115/1/60 | 115/1/60 | 115/1/60 |
| | **RATINGS** | | | | | | |
| | MAXIMUM BTU/HR INPUT @ SEA LEVEL TO 2000' | 500,000 | 750,000 | 1,000,000 | 1,500,000 | 1,800,000 | 2,500,000 |
| | *BTU/HR OUTPUT @ SEA LEVEL TO 2000' NAT GAS | 480,000 | 697,000 | 940,000 | 1,410,000 | 1,690,000 | 2,412,500 |
| | SHIPPING WEIGHT, LBS. | 1,477 | 1,477 | 1,554 | 1,940 | 2,061 | 3,600 |
| | OPERATING WEIGHT, LBS. | 2,224 | 2,224 | 2,276 | 2,835 | 2,932 | 4,654 |
| | INLET GAS PRESSURE, LO FIRE/HI FIRE "W.C. | 7.0/5.0 | 7.0/5.0 | 7.0/5.0 | 10.0/7.0 | 7.0/5.0 | 9.5/8.0 |
| | MAX. AMP DRAW FAN @ 115/1/60 | 4.0 | 4.0 | 4.0 | 8.5 | 12.0 | 12.0 |
| | AMP DRAW CONTROL CIRCUIT | 1.3 | 1.3 | 1.5 | 1.5 | 2.0 | 2.0 |

Note: Output based on return water temperature at 80°F

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CleaverBrooks®

221 Law Street • Thomasville, GA 31792
414-359-0600 • 800-250-5883
info@cleaverbrooks.com • cleaverbrooks.com


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