



HIGH-EFFICIENCY, LOW-EMISSIONS

# 4WI - CBLE

**WET-BACK/DRY-BACK FIRETUBES**

Steam & Hot Water 100-800 HP

# THE MODEL 4WI

## Delivering high-efficiency, low-emissions control worldwide.

Our Model 4WI wet-back firetube boiler not only offers high efficiency but low emissions with options for low NOx. The Model 4WI not only has a history of being reliable, but offers a smaller footprint, maximum safety, easy maintenance and long life. Engineered by Cleaver-Brooks to provide a low lifecycle cost, the 4WI is a great value for the investment.

### 100 – 800 HP

4-pass, wet-back configuration

High efficiencies guaranteed at \$10,000 per point!

Low emissions to less than 7 ppm NOx, on natural gas and less than 70 ppm NOx on #2 oil\*

Low NOx options (LE from 60 to 30) precisely matching your requirements

Ease of maintenance

Whisper-quiet operation

*\*Based on 0.02% fuel-bound nitrogen.*



# THE MODEL CBLE

Offering easy maintenance, safety and flexibility.

Our Model CBLE firetube boiler has the same design elements of the 4WI only in a dry-back configuration. With the same great offerings, the Model CBLE also comes with an integral burner. It's a boiler package designed for long life, high fuel-to-steam/water efficiency, maximum safety, lowest emissions, quiet operation, ease of maintenance and the flexibility to add desired options to further enhance the package.

## 125 – 800 HP

Dry-back configuration

High efficiencies guaranteed at \$10,000 per point!

Low emissions to less than 7 ppm NO<sub>x</sub>, on natural gas and less than 70 ppm NO<sub>x</sub> on #2 oil\*

Low NO<sub>x</sub> options (LE from 60 to 30) precisely matching your requirements

Ease of maintenance

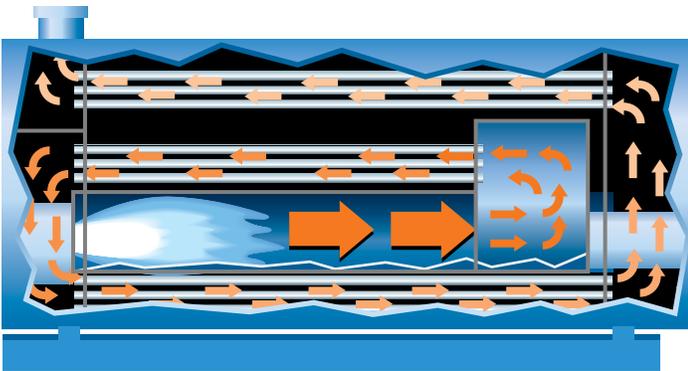
Whisper-quiet operation

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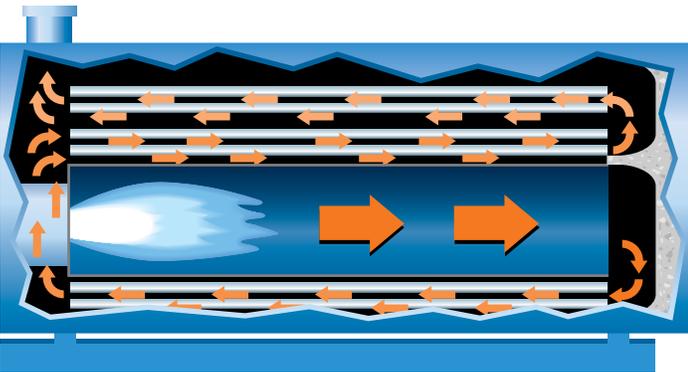


# WET-BACK OR DRY-BACK CONFIGURATION

The Cleaver-Brooks 4WI and CBLE line of firetube boilers are offered in either a 4-pass wet-back (4WI) or dry-back design (CBLE), both of which come with an integral burner. It's a boiler package designed for long life, highest fuel-to-steam/water efficiency, maximum safety, lowest emissions, quiet operation, ease of maintenance and the flexibility to add desired options to further enhance the package.



Model 4WI – Wet-Back Design



Model CBLE – Dry-Back Design

## Burner Design and the Furnace Geometry

Cleaver-Brooks team of highly qualified combustion and heat transfer engineers, using computational fluid dynamic modeling (CFD), collaborated in a design concept resulting in an optimized and efficient boiler package that is fully UL-approved and certified.

It all started with a basic set of design criteria:

- **Safety First** - Air-cooled integral front head and revolutionary LevelMaster™ water level control!
- **Space and Energy Savings** - Highly engineered boiler/burner package optimizes heat transfer surface.
- **Ease of Operation** - Unique AccuLink™ fuel/air control system; easy to set up, maintain!
- **Ease of Maintenance** - Everything is up-front, adjustable and accessible!
- **Efficient Fuel Burning** - High turndown on gas or #2 oil keeps the boiler efficiently online!

Most competitive burners may cycle on/off over 10 times per hour when operating below 25%. Excessive cycling means needless component wear and frequent pre/post purging; driving up maintenance and fuel costs. The Cleaver-Brooks High Turndown Burner (250-800 HP) is an integral part of our high-efficiency, low-maintenance and low-life-cycle-cost story.

## Burner and Furnace Compatibility

Excellent combustion and heat transfer begin with Computational Fluid Dynamics or CFD modeling, matching the heat delivery and transfer components into a synergistic package for optimum heat transfer, high efficiency and long life. Precise compatibility of the burner and furnace is critical.

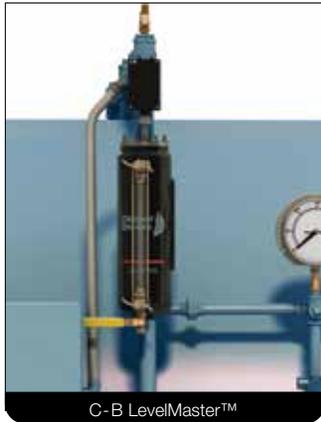
## Lowering Emissions

Minimizing emissions is entirely dependent upon proper burner design and compatible furnace geometry. The 4WI and CBLE line of firetube boilers offers NO<sub>x</sub> reduction options of less than 70 ppm when burning #2 oil and 60, 30, 9 to less than 7 ppm when burning natural gas in conjunction with flue gas re-circulation (FGR)!

By using combustion air to draw 4th-pass flue gas (FGR) into the combustion mix, the flame temperature is reduced to a level that limits the propagation of nitrous oxides without quenching the flame or reducing overall efficiency.

## Reliability & Long Life

Design engineering and manufacturing excellence the primary reasons for the extended life of a Cleaver-Brooks firetube boiler. With over 100,000 units in the field, the average life exceeds 25 years with many cases exceeding 50!



Therefore, reliability should not be considered an intangible. Not when you consider a single downtime occurrence can result in a production loss that far exceeds the cost of the boiler. And no other boiler holds such a high resale value or is the most preferred rental boiler choice. Why? Because it's the most ruggedly designed, efficient and reliable boiler on the market today.

## Highest Efficiency

Attaining high fuel-to-steam/water efficiency in a boiler today requires a highly engineered package from a single source that is providing integrated burner, controls and the heat exchanging vessel. Cleaver-Brooks 4WI and CBLE line of firetube boilers is the premier package in the industry, guaranteeing the highest efficiencies and backing it up with a \$10,000-per-point guarantee.

## Maximum Safety

The integral air-cooled front head, promoting comfort and safety, high-pressure steam boiler includes the revolutionary C-B LevelMaster™ low-water cutoff and level control. Combining solid state and microprocessor-based technologies, this level control with a brain is simply the safest low-water cutoff.

## Lowest Emissions

The Cleaver-Brooks 4WI and CBLE boiler's integral burner design includes the latest advances in combustion technology.

## “Hospital”-Quiet Operation

The secret to the Cleaver-Brooks 4WI and CBLE “hospital”-quiet operation is the integral burner. Simply the quietest in the industry!

## Flexible Options

Further enhancing the 4WI and CBLE models is an array of options to value-enrich the already outstanding offering. Things to consider include the following:

- **Low NOx Options** - Meet your particular jurisdictional needs burning natural gas. The “LE” for 60 – 30 ppm or the “NT” for ultra-low NOx emissions from 9 - <7 ppm and less than 70 ppm on #2 oil.
- **Parallel Positioning Actuators** - In lieu of the standard Acculink™ driver arm system to further enhance the outstanding fuel and air control.
- **Variable Speed Drive** - From controlling the primary combustion air fan to substantially reducing electrical costs especially if your boiler modulates frequently between low and high fire.
- **Modulating Feedwater Valve** - Option to better control the boiler's water level; working in conjunction with the standard Level Master control on high-pressure steam units.
- **O<sub>2</sub> trim system** - Reduces fuel consumption based on varying environmental conditions such as varying barometric pressure, ambient temperature, etc.
- **Hawk 1000/4000 Boiler Management Control** - A totally integrated PLC-based control system embodying precise boiler/burner management, safety, interconnectivity and high-powered communications in a single package!



# Low Life Cycle Cost

The best way to evaluate the actual cost for a long-term asset is through the life cycle costing discipline. When evaluating the best and lowest overall cost boiler to choose, one should seriously consider the following criteria in addition to initial cost:

## **What boiler gives me the longest life, reducing my replacement/renewal costs over the required life span of the asset?**

The average Cleaver-Brooks firetube boiler has a life expectancy of 25 years with hundreds of units still efficiently performing after 50 years!

## **What boiler offers the greatest opportunity to upgrade, keeping the asset up-to-date, further increasing its life span?**

The Cleaver-Brooks 4WI and CBLE boilers offer many options that can be retrofitted later, keeping it current and state-of-art for years to come! Or you may wish to add them now!

## **What boiler consumes the least amount of floor space, saving on initial cost during new construction?**

The Cleaver-Brooks 4WI and CBLE boilers consume less space on average when compared to their closest competition. This, because of their optimized shell diameters, larger furnace volumes and integral burner. With rising costs for new construction, this is a significant offset to initial boiler cost!

## **What boiler will deliver the best fuel-to-steam/water efficiency?**

The optimized and fully featured Cleaver-Brooks 4WI and CBLE boilers will on average save up to 5% in fuel cost annually when compared to their nearest competition. Remember too, that the average boiler consumes at least four (4) times its original cost in fuel during its first year of operation, and Cleaver-Brooks guarantees its efficiencies at \$10,000 per point!

## **What boiler will provide the lowest emission levels, reducing possible penalty costs and/or providing the greatest amount of emission credit opportunity?**

The C-B 4WI and CBLE line of boilers offer the “LE” from 60 – 30 ppm and the “NT” for ultra low emissions from 9 - <7 ppm and less than 70 ppm with #2 oil!

## **What boiler gives me the lowest operating or sustaining cost over its life span?**

The Cleaver-Brooks 4WI and CBLE model boilers with optimized design offer the highest fuel-to-steam/water efficiency when compared to their nearest competition. Additionally, their operating and service-friendly features provide ease of operation and maintenance; unsurpassed

in the industry! Conservatively, this saves you thousands of dollars per year when compared to the nearest competitor!

## **What boiler gives me the highest residual value, reducing my life cycle cost should I choose to liquidate the asset?**

Cleaver-Brooks boilers have traditionally been the boiler of choice for used equipment suppliers and rental companies because of their rugged quality, high efficiency and ease of operation and maintenance.

## **What boiler supplier gives me the greatest assurance of service and parts backup, increasing my uptime and saving production- or space-occupying losses?**

Cleaver-Brooks has the largest network of Representatives throughout the world providing service and parts 24/7. It is your peace of mind and assurance of protection that keep our thousands of satisfied customers coming back year after year for upgrades and new equipment.



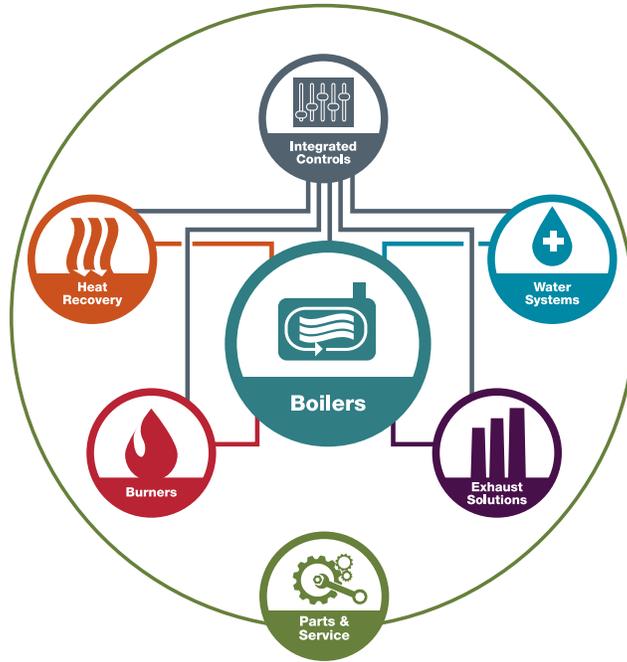
# When Specifying, Buying or Replacing Your Next Boiler

## Remember the Cleaver-Brooks 4WI & CBLE Advantages:

- Highest efficiencies guaranteed at \$10,000 per point
- Lowest emissions to less than 7 ppm NOx on natural gas and less than 70 ppm NOx on #2 oil
- Low NOx options (LE from 60 – 30, NT from 9 to less than 7 ppm) precisely matching your requirements
- 4-pass Wet-Back or Dry-Back option
- Space savings
- Long life
- Maximum safety
- Ease of maintenance
- Whisper-quiet operation
- Flexible options
- Lowest life cycle cost
- Single source, single responsibility and backed up by an extraordinary sales and service distribution network that provides 24/7 service and parts all around the world



University of Florida Installation of Three CBLE Firetube Boilers



# 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, 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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