

HIGH EFFICIENCY, LOW EMISSIONS

WET-BACK/DRY-BACK FIRETUBE BOILERS



Models 4WI and CBLE
Steam & Hot Water 100-800 HP

Models 4WI & CBLE

The industry's **LEADER**
in **LOW EMISSIONS,**
HIGH EFFICIENCY and
BEST VALUE for the in-
vestment

- Highest efficiencies guaranteed at \$10,000 per point!
- Lowest emissions to <9 PPM NO_x, on Natural Gas and <70 PPM NO_x on #2 Oil*
- Low NO_x options (LE from 60 – 30, NT from 15 - <9 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

*Based on 0.02% fuel bound nitrogen.



Throughout our 75 year history, Cleaver-Brooks has been symbolized by the flame in hand representing the Greek god Prometheus who harnessed fire for the betterment of mankind. This tradition of service and continual pursuit of excellence in improving our heat generating equipment continues to this day, and is typified by our newest line of firetube boilers, the 4WI and CBLE models.



It all Begins with the BURNER DESIGN and FURNACE GEOMETRY



Cleaver-Brooks team of highly qualified combustion and heat transfer engineers, using computational fluid dynamic modeling (CFD), collaborate in a design concept resulting in the most optimized and efficient boiler package on the market today; Fully UL approved and certified!

It all starts with a basic set of design criteria:

- Safety First - Air cooled integral front head and revolutionary Level Master™ 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 setup, 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 on line!

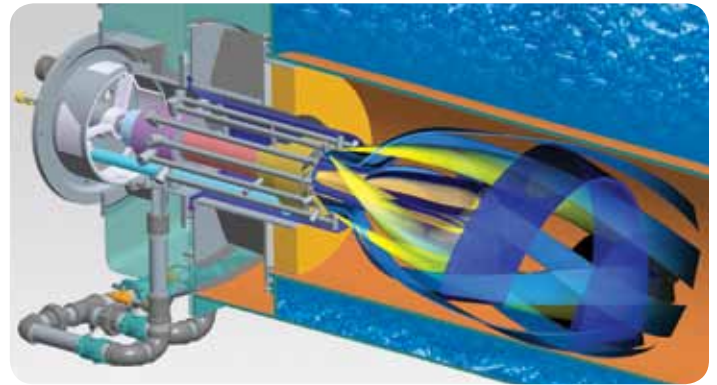
Most competitive burners may cycle on/off over 10 times per hour when operating below 25%. Excessive cycling means needless component wear and frequent pre/post purging; driving up maintenance and fuel costs. The Cleaver-Brooks High Turndown Burner (250-800 HP) is an integral part of our high efficiency,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

BURNER and FURNACE COMPATIBILITY

Excellent combustion and heat transfer begins with CFD modeling, matching the heat delivery and transfer components into a synergistic package for optimum heat transfer, highest efficiency, and long life. Precise compatibility of the burner and furnace is critical.

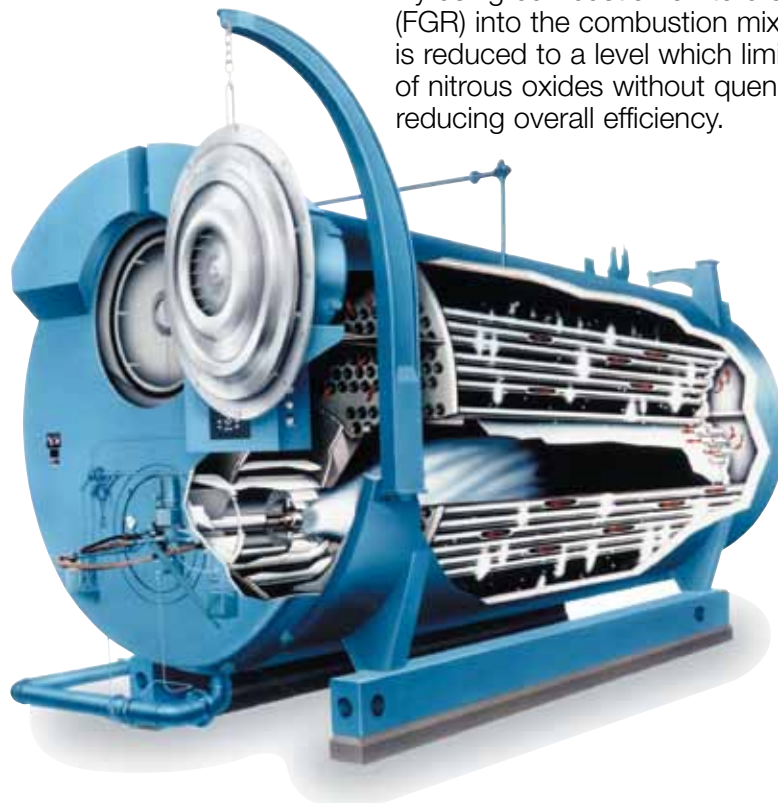
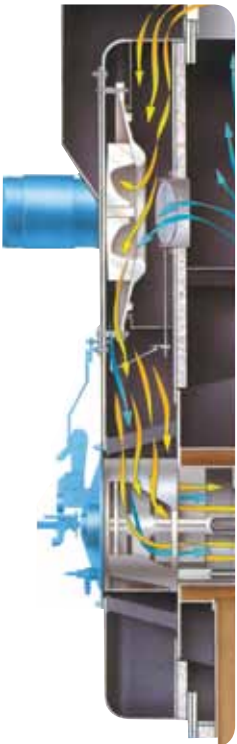


LOWERING EMISSIONS



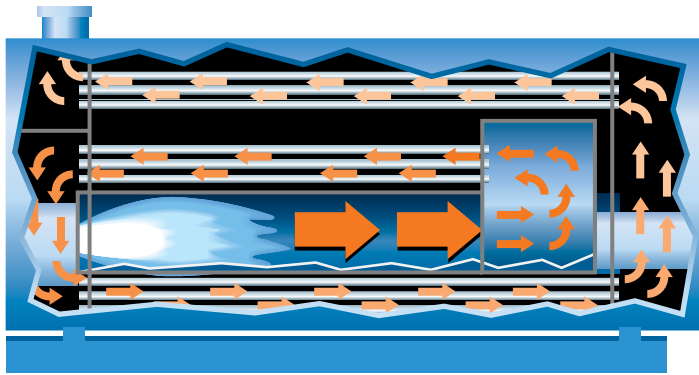
Minimizing emissions is totally dependent upon proper burner design and compatible furnace geometry. The 4WI and CBLE line of firetube boilers offers NOx reduction options of less than 70 PPM when burning #2 oil and 60, 30, 15 to less than 9 PPM when burning natural gas in conjunction with flue gas re-circulation (FGR)!

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

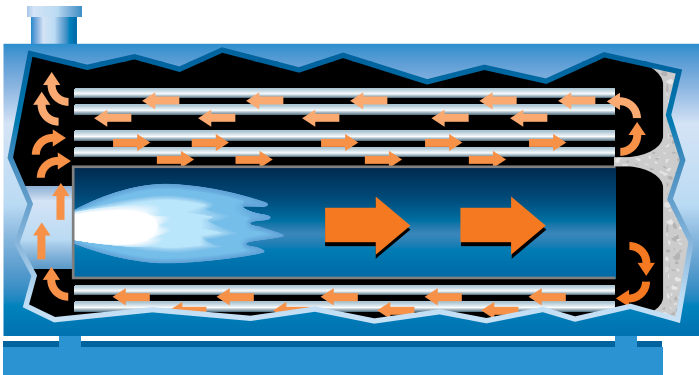


4-PASS DESIGN in a WET-BACK or DRY-BACK configuration

The Cleaver-Brooks 4WI and CBLE line of firetube boilers are offered in either a 4-pass wet-back (4WI) or a 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



Reliability & Long Life

Design engineering and manufacturing excellence; 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....So, when you look at a Cleaver-Brooks packaged boiler, think reduced cost. Because that's what we've provided for decades in thousands of boiler rooms world wide. 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 who 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 Level Master™ 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.



C-B Level Master™

Lowest Emissions:

The Cleaver-Brooks 4WI and CBLE boiler's integral burner design include 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!



NT burner insert

Ease of Maintenance:

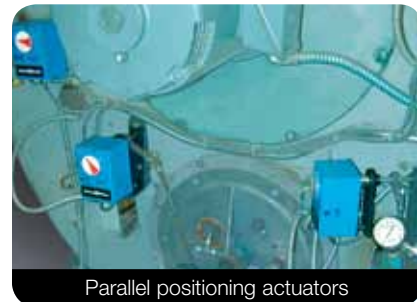
Hinged or davited doors for easy access, our EZ swing fan and motor assembly not requiring front door opening, integral burner with AccuLink™ adjustable fuel/air controls, pull out burner drawer for ease of inspection and adjustment, retractable oil nozzle - just to name a few.

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 15 - <9 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.



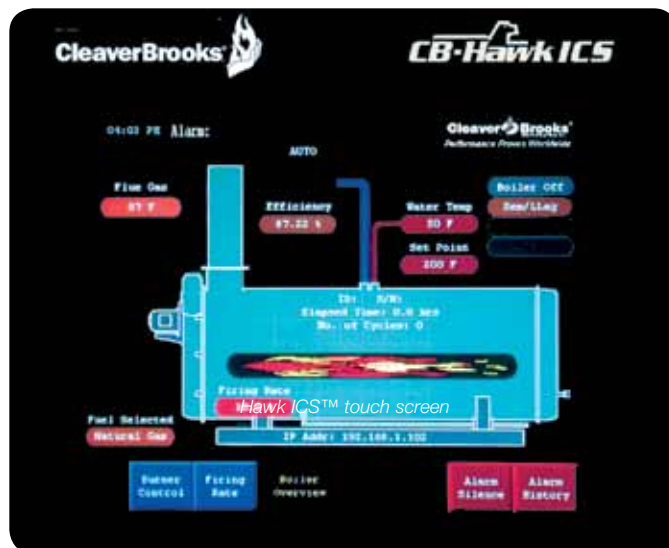
Parallel positioning actuators



Variable speed drive

- **Variable Speed Drive** - For controlling the primary combustion air fan to substantially reduce electrical costs especially if your boiler modulates considerably 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.
- **O2 trim system** - Reduces fuel consumption based on varying environmental conditions such as varying barometric pressure, ambient temperature, etc.
- **Hawk ICS™ 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!





It all ends with the **LOWEST LIFE CYCLE COST BOILER** on the **MARKET TODAY**

Most financial people in any organization will say that the best way to evaluate the actual cost for a long term asset is through the life cycle costing discipline. The method of calculating the total cost of ownership over the span of the asset. Initial cost plus all significant subsequent costs (fuel, etc.) are included in the

calculations along with the salvage value as an offset to total cost.

A boiler is a perfect example of an asset which should be evaluated using this technique as it is certainly a long term investment and its operational (sustaining) expenses including fuel, operating and maintenance

expenses will exceed the initial acquisition cost by at least 100 times before its life expectancy is reached. As a matter of fact, the fuel alone for (1) year will in most cases exceed the original cost by at least 400%!!

It therefore stands to reason, 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 which can be retrofitted later, keeping it current 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 its closest competition. This, because of its optimized shell diameters, larger furnace volumes and integral burner. With rising costs for new construction, 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 its 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 15 - <9 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 its nearest competition. Additionally, its 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 which keeps our thousands of satisfied customers coming back year after year for upgrades and new equipment.

Worldwide Sales, Parts and Service



International Representatives

- Argentina
- Australia
- Bahamas
- Bangladesh
- Barbados
- Belize
- Bermuda
- Bolivia
- Bulgaria
- Chile
- Colombia
- Costa Rica
- Dominican Republic
- Ecuador
- Egypt
- El Salvador
- England
- Guam
- Guatemala
- Haiti
- Honduras
- Hong Kong
- Israel
- Jamaica
- Jordan
- Kuwait
- Mexico
- Nicaragua
- Oman
- Pakistan
- Panama
- Paraguay
- Peoples Republic of China
- Peru
- Philippines
- Puerto Rico
- Qatar
- Romania
- Saudi Arabia
- Singapore
- Taiwan
- Thailand
- Trinidad
- Vietnam
- U.A.E. (Dubai)
- Uruguay
- Venezuela





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- Ease of maintenance
- Whisper quiet operation
- Flexible options
- Lowest life cycle cost
- All backed by the **BEST SALES AND SERVICE NETWORK** in the Business!



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