



HIGH EFFICIENCY, LOW EMISSIONS

4WG - ICB

WET-BACK/DRY-BACK FIRETUBES

Steam & Hot Water 100-800 HP

THE MODEL 4WG

Delivering high efficiency and low emissions.

Our Model 4WG 4-pass, wet-back firetube boiler not only offers high efficiency but low emissions with options for low NOx. Engineered by Cleaver-Brooks to be a fully compatible boiler/burner package featuring excellent fuel to steam/water efficiency, space savings, and low emissions. The versatile Cleaver-Brooks 4WG also has the flexibility to add desired options to further enhance the package.

100 – 800 HP

4-pass, wet-back configuration

High and low pressure steam and hot water

Low emissions to less than 9 PPM NOx, on Natural Gas and less than 90 PPM NOx on #2 Oil*

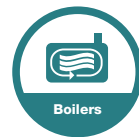
Low NOx options (LE from 75 to 30, NT from 15 to less than 9 PPM) precisely matching your requirements

Compact design

Offers additional upgrade options

**Based on 0.02% fuel bound nitrogen.*





THE MODEL ICB

Offering design flexibility and ease of maintenance.

Our Model ICB firetube boiler has similar design elements of the 4WG but available in both a 3-pass or 4-pass design. With the same great offerings, the Model ICB is also offered in either a wet-back or dry-back configuration. It's a boiler package that offers flexible design, high fuel to steam/water efficiency, low emissions, unmatched ease of serviceability and maintenance.

100 – 800 HP

3- or 4-pass design

Both wet-back or dry-back configurations

High fuel to steam/water efficiencies

Low emissions from 75 to 30 PPM on Natural Gas and less than 90 PPM NOx on #2 Oil*

Low NOx options available to less than 30 PPM

Compact design

Ease of maintenance

**Based on 0.02% fuel bound nitrogen.*



Model 4WG

This 4-pass wet-back firetube boiler is ruggedly constructed for hot water or low and high pressure steam applications. Ranging in size from 100-800 horsepower, this gas, #2 oil or combination fired product is a highly engineered and fully compatible boiler/burner package featuring excellent fuel to steam/water efficiency, space savings, low emissions, and optional upgrades.



Excellent efficiency

Attaining high fuel to steam/water efficiencies, in excess of 80%, does not happen by chance. It requires exacting combustion and heat transfer design to assure optimum performance throughout the entire firing range. The model 4WG's precise matching of the advanced ProFire LE (75 & 30 PPM) and ProFire NT (15 - <9 PPM) burners to the heat exchanging furnace and convection section is without precedent.

Compact design

With ever rising mechanical room construction costs, it's critical that the design team creates a boiler package that conserves every inch of your valuable floor space. The Cleaver-Brooks 4WG's large furnace area allows over 35% of the energy to be absorbed in the furnace. This means a shorter boiler overall; therefore, considerably less space is required. A significant consideration when construction budgets or boiler rooms are tight!

Low emissions

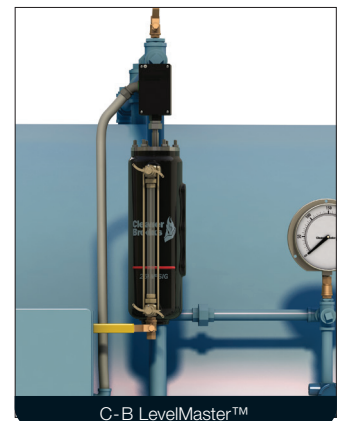
Lowering emissions in the Cleaver-Brooks 4WG involves two key factors; (1) advanced burner design and (2), the proper sizing of the furnace to minimize nitrogen oxides and other contaminants from forming during the combustion process.

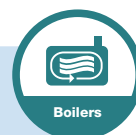
Given these dynamics, the 4WG can be equipped with one of two burners depending on the degree of NOx reduction desired. If medium reduction is sufficient, the ProFire LE burner will be applied delivering a maximum of 75 or 30 PPM when burning natural gas and employing FGR. If high reduction is desired, the ProFire NT becomes part of the package, delivering 15 to less than 9 PPM on natural gas, 90 PPM on #2 oil.

Optional upgrades

The versatile Cleaver-Brooks 4WG can be easily upgraded with options during manufacture, or they can be retrofitted later.

- The standard ProFire® burner can be changed to the ProFire LE or NT burner providing the maximum in combustion efficiency and low NOx technology.
- Upgrade the standard burner management control to the Hawk. A totally integrated PLC based control system embodying precise boiler/burner management, safety, interconnectivity and high powered communications in a single package.
- Replace the standard low water cut-off with Cleaver-Brooks revolutionary LevelMaster low water cut-off and level control. Combining solid state and microprocessor based technologies, this level control "with a brain" is simply the safest low water cut-off on the market today!

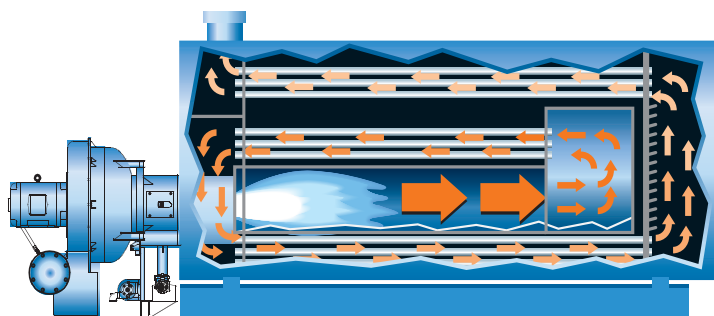




Model ICB

WET-BACK OR DRY-BACK CONFIGURATION

The Cleaver-Brooks ICB firetube boilers are offered in either a 3- or 4-pass, wet- or dry-back design, both of which are offered in (12) sizes ranging from 100 – 800 HP, low- and high- pressure steam and hot water, burning natural gas, # 2 oil or combination. With the ProFire® packaged burner and larger furnace, the model ICB optimizes radiant heat transfer, maintaining high efficiencies, lowering emissions, easing maintenance, all while conserving valuable floor space.



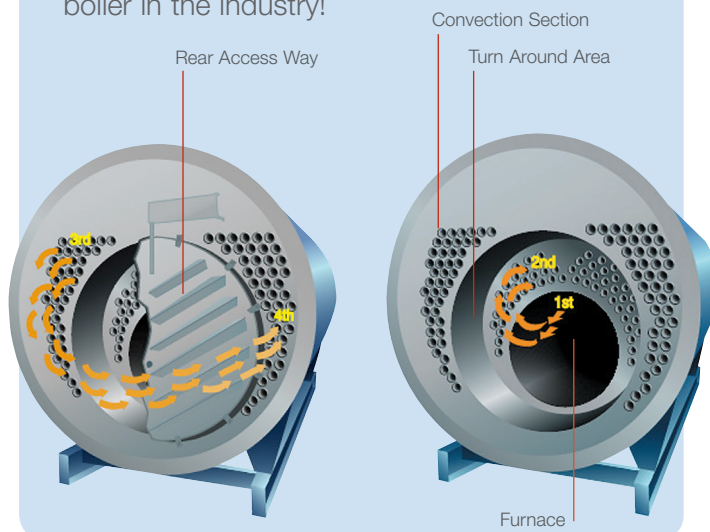
Model 4WG – Dry-Back Design

Key features include:

- **Excellent efficiency:** High fuel to steam/water efficiencies are again attained with this model due to precise matching of the burner with the heat exchanging furnace and convection section within the pressure vessel and, the recuperating rear access way.
- **Lower emissions:** Similar to the 4WG line, the ICB offers a medium NOx reduction package featuring the LE burner for 75 or 30 PPM when burning natural gas. Consult the factory for reductions below these levels.

Inter-cooled rear access way:

Relatively cool 3rd pass gas passing across the Btu recuperating rear access way, cooling the back; transferring the heat to the 4th pass where it is absorbed into the water. This feature is not available on any other wet-back boiler in the industry!



Ease of maintenance

The ICB is unmatched when it comes to serviceability and ease of maintenance. The rear of the boiler includes a davited door which swings completely out of the way to expose a large rear access way (also davited) which swings out exposing the generous turnaround area and second pass tubes. The result is FULL ACCESSIBILITY for inspecting, cleaning and repairing without concern for “confined space entry.” The C-B ProFire burner with hinged windbox also facilitates maintenance by not having to remove the burner from the boiler.

Compact design

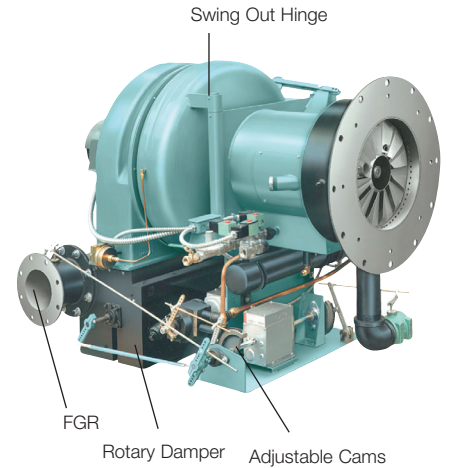
The optimized pressure vessel and recuperating rear access way with the model ICB allows more heat to be efficiently transferred within a smaller package without compromising efficiency. The davited doors further enhance the benefit; saving valuable floor space when compared with other manufacturers. Additionally, the ICB can be made into a 3 pass boiler, accommodating difficult venting arrangements should it be necessary to save installation costs.

Our Highly Engineered Boiler Offerings Start With CFD Modeling

- Highly efficient fuel burning packages with excellent turndown on gas and #2 oil
- UL compliant packages
- Accurate fuel/air ratio control with 14 point adjustment cam(s), simple linkage assembly and Cleaver-Brooks ProFire burner's unique rotary air damper
- Low emission options ranging from 75, 30, 15 to less than 9 PPM (model 4WG only) on natural gas and 70 PPM on #2 oil
- Ease of setup and adjustment of the fuel/air and FGR when applicable
- Easy access to burner components with swing out burner assembly
- Optimum safety with state of the art burner management and limiting control schemes

Lowering Emissions

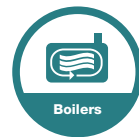
Maximizing efficiency and minimizing emissions requires excellent burner design and burner compatibility for flame shaping and temperature control throughout the entire firing range. It is critical in reducing NOx formation and maximizing fuel to steam/water efficiency. The 4WG & ICB line of firetube boilers offers low NOx packaged burners with and without flue gas recirculation (FGR) affording a range of NOx maximums depending on the given application. Available in 75 (no FGR), 30, 15, to <9 PPM NOx when burning natural gas and 70 PPM with #2 oil, this line covers the gamut when it comes to meeting increasingly stringent air regulations.



And The Real Difference Is Found Inside Burner and Furnace Compatibility

Optimum combustion and heat transfer begins with the fuel and air delivery system and progresses to the firing head where the proper amounts of fuel and air are united to form a combustible mix resulting in the highest combustion efficiency and lowest emissions. Compatibility of the burner and furnace is therefore critical.





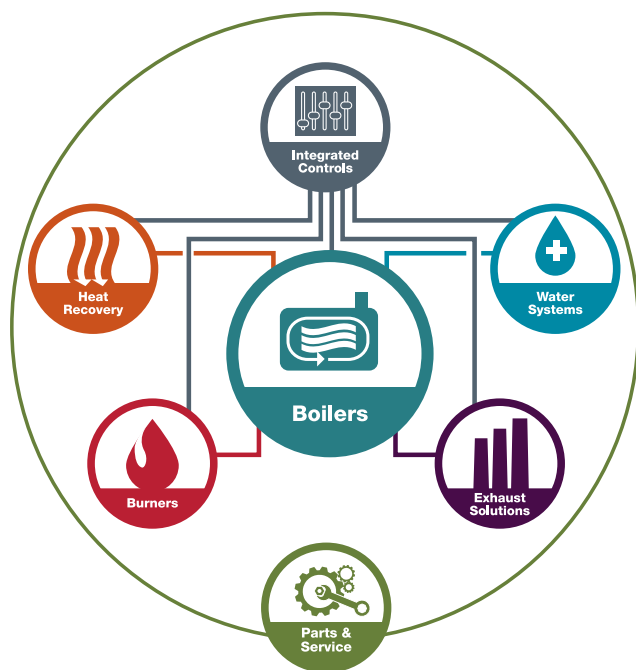
When Specifying, Buying or Replacing Your Next Boiler

Remember the Cleaver-Brooks 4WG & ICB Advantages:

- Highly engineered packages matching burner & boiler for optimum performance
- Provides application flexibility with multiple fuel firing
- Size range from 100 – 800 horsepower
- Hot water, low or high pressure steam
- Lowest emissions to less than 9 PPM NOx on natural gas and 90 PPM #2 oil
- Model 4WG offers low NOx options (LE from 75 to 30, NT from 15 to less than 9 PPM)
- Four (4) pass design means excellent fuel to steam/water efficiencies
- Space savings
- Ease of maintenance
- Flexible options
- Maximum safety
- Ease of maintenance
- 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!



Charlotte Medical Center installation of three ICB firetube boilers



Total Integration goes far beyond boilers.

Efficiency and quality don't end with our boilers. Cleaver-Brooks complete integration produces the most efficient boiler solutions in the world. Completely designed, engineered, manufactured, integrated, and serviced by one company, our systems don't have a single outsourced component to jeopardize compatibility or performance. If you're looking for the best-quality boiler systems with the lowest emissions and highest efficiencies, you're looking for Cleaver-Brooks.



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