

HIGH EFFICIENCY, LOW EMISSIONS

WET-BACK FIRETUBE BOILERS



Models 4WG and ICB
Steam & Hot Water 100-800 HP

WHEN SPECIFYING, BUYING OR REPLACING YOUR NEXT BOILER

remember the Cleaver-Brooks 4WG & ICB advantages:

Four (4) Pass wet-back boilers ranging in size from 100 – 800 HP

High and low pressure steam and hot water

Highly engineered packages, matching burner with boiler to deliver:

- Fuel economy
- Low emissions
- Compact footprint

NOx reductions from 75 - <9 PPM on gas and 70 PPM on #2 oil 9 PPM NOx is only available on model 4WG

The model ICB is available in 3 pass design if desired

Optional upgrades such as the LevelMaster™ low water cutoff or Hawk™ Boiler Management control system, adding additional value to an already value rich offering.

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!



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 <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



14 Point Adjustable Fuel Cams



Rotary Damper

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.



UNIQUE FEATURES



MODEL 4WG

This four 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.



Large Radiant Furnace Area

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 - <9 PPM on natural gas, 70 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 **C-B 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 features with Dry-Back Advantages

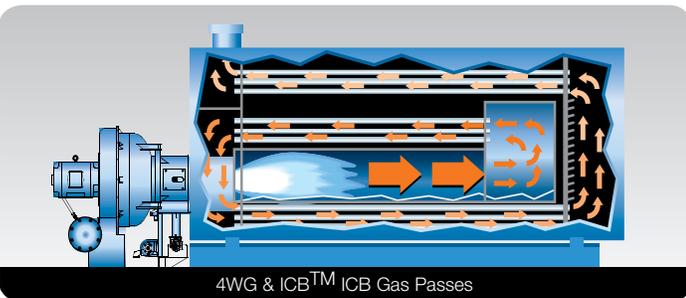
This boiler model is truly unique! Its designed to incorporate the key features and benefits of both a wet-back and dry-back boiler while delivering exceptional value at a competitive price! The key is the revolutionary inter-cooled rear turnaround chamber coupled with the Profire packaged burner and larger furnace; optimizing radiant heat transfer, maintaining high efficiencies, lowering emissions, easing maintenance... all while conserving valuable floor space!

This model of boiler is offered in (12) sizes ranging from 100 – 800 HP, low and high pressure steam and hot water, burning natural gas, # 2 oil or combination.



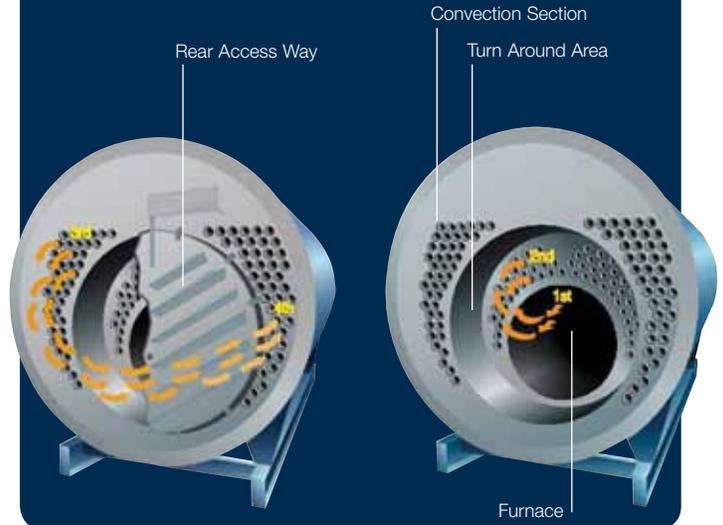
Key features include:

- **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.

Models 4WG & ICB

The industry's new standard for firetube boiler packages

- 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 < 9 PPM NOx on natural gas and 70 PPM #2 oil*
- Four (4) pass design means excellent fuel to steam/water efficiencies
- Space savings
- Ease of maintenance
- Flexible options

*Based on 0.015% fuel bound nitrogen.



Throughout our 80 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 symbol represents a tradition of service and continual pursuit of excellence in ever improving our heat generating equipment. That tradition continues to this day, and is typified by a range of wet-back firetube boilers with packaged burners, the 4WG & ICB™ line.

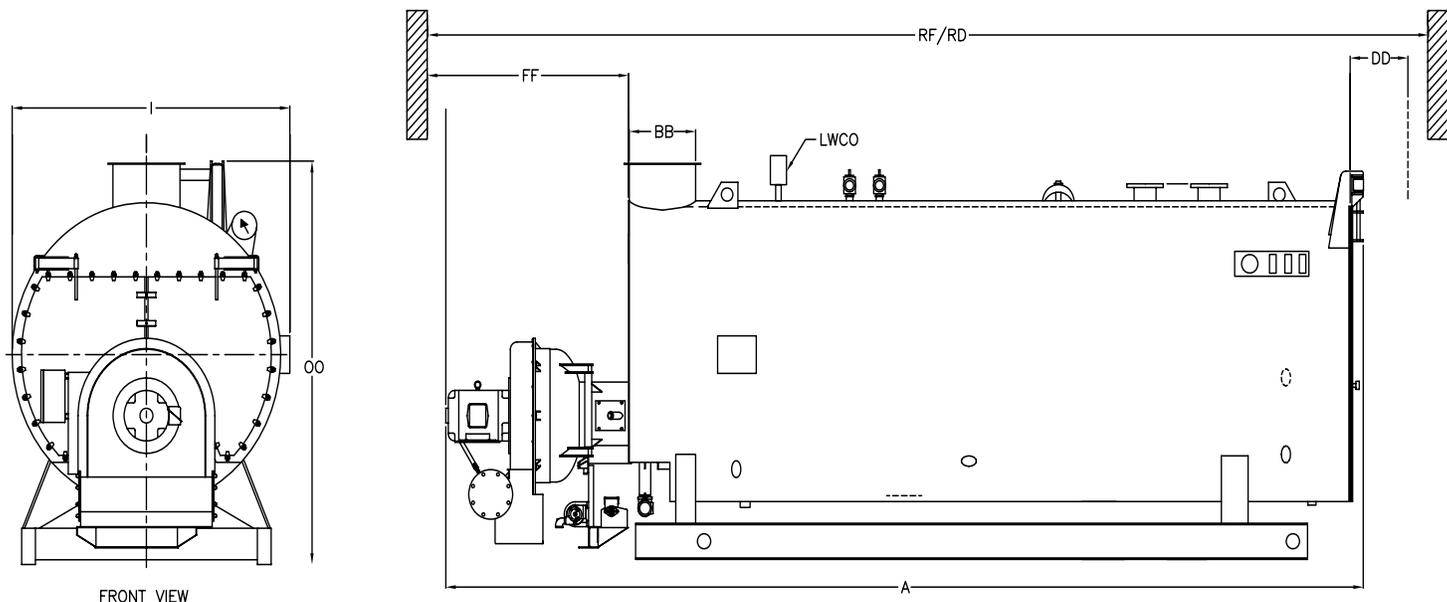
The 4WG & ICB line answers our customers' need to address the issues of unpredictable fuel availability, ever-rising product, energy and operating costs, plus environmental pressures to reduce emissions. The 4WG & ICB is an optimized line which not only addresses these most critical demands, but offers two models to accommodate the full range of needs with a wide array of choices. A line which sets a new standard for packaged burner packages; a standard which defines "state-of-the-art" as it establishes yet another Cleaver-Brooks benchmark for fuel efficiency and low emissions in a single source package.

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
- Honduras
- Hong Kong
- Israel
- Jamaica
- Jordan
- Kuwait
- Mexico
- Nicaragua
- Oman
- Pakistan
- Panama
- Paraguay
- Peoples Republic of China
- Peru
- Philippines
- Puerto Rico
- Qatar
- Saudi Arabia
- Singapore
- Taiwan
- Thailand
- Trinidad
- U.A.E. (Dubai)
- Uruguay
- Venezuela
- Vietnam



DIMENSIONS & RATINGS

All measurements are provided in inches. Measurements are the same for steam and hot water units except where noted.

BOILER H.P.	DIM	100	125	150	200	250	300	350	400	500	600	700/800	*800
*800 HP w/4,000 sq.ft. of heating surface													
Overall Length (60 PPM system)	A	176	200	190	224	230	254	250	271	277	312	304	331
Overall Width (HW)	I	83	77	81	81	90	90	100	100	116	117	123	123
Overall Width (Steam)	I	91	85	92	92	103	103	110	110	125	126	133	133
Base to Rear Davit	OO	87	87	93	93	99	99	113	113	126	126	135	135
Rear Door Swing	DD	36	36	40	40	46	46	50	50	55	55	60	60
Tube Removal - Front	FF	96	120	108	142	133	157	148	166	169	204	188	215
Minimum boiler room length allowing for door swing and tube removal from:													
Through Window or door	RD	234	258	261	295	308	332	337	355	377	412	411	438
Front of Boiler	RF	263	311	291	359	351	399	388	424	438	508	481	535
RATINGS -sea level to 700 ft		100	125	150	200	250	300	350	400	500	600	700	800
Rated Capacity (lbs-steam/hr from and at 212 °F)		3,450	4,313	5,175	6,900	8,625	10,350	12,075	13,800	17,250	20,700	24,150	27,600
Btu Output (1000 Btu/hr)		3,347	4,184	5,021	6,694	8,368	10,042	11,715	13,389	16,736	20,083	23,430	26,778
Approximate fuel consumption at rated capacity based on normal 82% efficiency													
Light of ghp (140,000 btu/gal)		29.2	36.4	43.7	58.3	72.9	87.5	102.0	116.6	145.8	174.9	204.1	233.3
Gas CFH (1000 Btu)		4,082	5,102	6,123	8,164	10,205	12,246	14,287	16,328	20,410	24,492	28,574	32,656
Gas (Therm/hr)		40.8	51.0	61.2	81.6	102	122.5	142.9	163.3	204.1	244.9	285.7	326.6



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

Printed in the USA
 ©2010 Cleaver-Brooks, Inc
 CB-8051
 05/11