

BURNHAM[®]

Commercial Boilers

**LONG-TERM
ENERGY
EFFICIENCY**

LESS COST

BUILT TO LAST

INCREASED
PERFORMANCE

PROMOTE GOOD
INTERNAL WATER
CIRCULATION



Series 3

PACKAGED FIRETUBE BOILER

Series 3 PACKAGED FIRETUBE BOILER

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The Burnham Commercial Wetback Advantage

Over the life of a dryback, brittle refractory baffling and rear door gasketing will require continuous monitoring, maintenance and replacement, costing thousands upon thousands of dollars. **These built-in maintenance costs can eventually equal or exceed the original cost of the boiler.** As refractory deteriorates, leaking hot gas causes boiler efficiency to drop until the condition is noticed and the repairs can be made. Expensive flue temperature alarms are offered with some drybacks to monitor this dangerous and costly potentiality. The rear door itself can become heat-distorted, requiring an expensive replacement. In addition, boiler downtime during repairs can mean crippling losses.

This waste of time and money is eliminated with the Burnham Commercial wetback design. The actively functional water jacket eliminates the need for: refractory wall, rear door, rear door inspection and sealing, door swing space and flue temperature alarm. These costly maintenance headaches are gone, while boiler performance is **increased**. Burnham Commercial has only a small, inexpensive refractory area in the burner area, for burner mounting. The rear access door liner is a ceramic fiber insert that contains no refractory.

The furnace and rear turnaround area are cool running, fully wetbacked radiant heat transfer surfaces. They promote good internal water circulation and rapid heat absorption. There is no need for the forced internal circulation pumps often specified to cool the rear tube-sheets and drybacks.

The Burnham Commercial Wetback is Built to Last

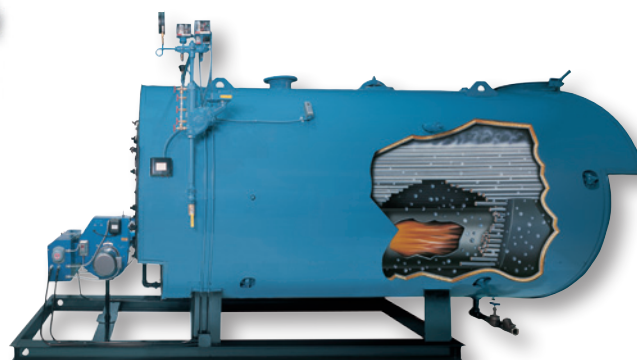
Typical dryback boilers have a common rear tubesheet that expands and contracts at different rates adjacent to each tube pass, stressing tube ends and increasing the likelihood of leaks. Additionally, the heavy refractory used in some drybacks reflects intense heat to the rear tube ends and tube sheet, accelerating their deterioration. In attempts to stop leaking, the rear ends of tubes have sometimes been welded. Cleaning or tube replacement involves opening both the front and rear covers and resealing them when the job is done. Usually, if tubes have been welded at the ends, the welds must be burned out, the tube sheet repaired (or a new segment welded in) and the new tubes welded.

These costly expenditures are not an issue with the Burnham Commercial Scotch Marine: separate rear tube sheets from each pass to expand and contract at its own rate without tube-to-sheet stress. Tubes are rolled and flared in low-pressure units; and rolled, flared and beaded in high-pressure units. No welding of tubes is permitted, nor is it necessary. Any eventual tube replacement is simply a mechanical operation, no welding involved. The end result is less cost and less headache.

For more information, drawings or specifications, visit www.burnhamcommercial.com.



FRONT VIEW



SIDE VIEW



REAR VIEW

Series 3 RATINGS AND DATA

Ratings and Data

Boiler Model	Shell Diam.	GROSS OUTPUT			NET RATING			HEATING SURFACE		FIRING RATE		FURNACE VOLUME	WATER CONTENT		APPROX. WT. DRY, LBS.	
		BHP	MBH	Lbs./Hr.	Steam MBH	Steam Sq. Ft.	Water, MBH	Sq. Ft. F.S.	Sq. Ft. W.S.	Gas, MBH	Oil, GPH	Cu. Ft.	Lbs. Steam	Lbs. Water	15-30 PSI	150 PSI
40	48	40	1,339	1,380	1,011	4,211	1,164	200	220	1,674	12/11	14.8	1,760	2,185	3,700	4,200
50	48	50	1,674	1,725	1,290	5,376	1,456	250	280	2,093	15/14	17.1	2,303	2,701	4,200	4,700
60	48	60	2,009	2,070	1,560	6,499	1,747	300	335	2,500	18/17	19.3	2,765	3,235	4,700	5,200
70	54	70	2,343	2,415	1,819	7,580	2,037	350	390	2,930	21/20	27.8	3,285	4,160	5,500	6,200
80	54	80	2,678	2,760	2,079	8,663	2,329	400	445	3,348	24/23	30.2	3,672	4,641	5,900	6,700
90	54	90	3,013	3,105	2,339	9,747	2,620	450	500	3,766	27/25	33.0	4,060	5,143	6,400	7,200
100	54	100	3,348	3,450	2,599	10,830	2,911	500	555	4,185	30/28	35.8	4,523	5,711	6,900	7,700
125	66	125	4,184	4,313	3,248	13,535	3,638	625	695	5,230	38/25	41.9	5,585	6,673	8,700	9,500
150	66	150	5,021	5,175	3,898	16,243	4,366	750	835	6,276	45/42	47.7	6,660	7,947	9,700	10,600
175	66	175	5,858	6,040	4,548	18,950	5,094	875	970	7,333	52/49	53.1	7,758	9,245	10,900	11,600
200	66	200	6,695	6,900	5,198	21,658	5,822	1,000	1,110	8,369	60/56	58.8	8,829	10,519	12,300	13,300
250	78	250	8,369	8,625	6,498	27,074	7,277	1,250	1,360	10,461	75/70	86.6	11,174	13,983	15,400	18,600
300	78	300	10,043	10,350	7,797	32,489	8,733	1,500	1,630	12,500	90/84	99.1	12,315	16,649	18,100	21,400
350	90	350	11,716	12,075	9,096	37,901	10,188	1,750	1,900	14,645	105/98	113.5	15,392	19,340	21,000	23,700
400	90	400	13,390	13,800	10,396	43,317	11,643	2,000	2,175	16,738	120/112	124.7	16,765	22,125	23,200	26,100
500	102	500	16,738	17,250	12,995	54,147	14,555	2,500	2,715	20,923	150/140	152.0	18,515	23,788	27,400	30,600
600	102	600	20,085	20,700	15,594	64,957	17,465	3,000	3,260	25,106	180/168	174.3	22,128	28,381	31,500	35,500
700	102	700	23,433	24,150	18,193	75,805	20,377	3,500	3,805	29,319	210/196	195.8	25,767	33,005	35,700	39,700
800	108	800	26,780	27,600	20,792	86,633	23,287	4,000	4,349	33,475	240/224	302.3	33,945	43,762	43,900	52,900
900	114	900	30,128	33,217	23,500	97,615	N/A	4,500	4,905	37,660	269/252	278.0	40,893	N/A	47,800	56,600
1000	144	1,000	33,476	34,500	25,990	108,294	N/A	5,000	5,430	41,846	300/280	309.0	45,437	N/A	51,600	102,200

NOTE: Dimensions and Data are not for construction purposes and are subject to change without notice

- Large, fully waterbacked furnace tube assures complete combustion and heat absorption without flame impingement.
- Three gas passes extract maximum usable heat from the fuel while maintaining optimum flow for forced draft firing.
- Fully waterbacked reversing chamber effectively absorbs radiant heat into the water, keeping tube ends and rear of boiler cooler than those of hot-running drybacks.
- Ready access to tubes through rugged front door and rear covers makes routine cleaning easier and less costly than with drybacks.
- Burner does not have to be disturbed.
- No inner air baffle door to contend with.
- No delicate expensive baffle tiles or door seals to replace.
- Unlike dryback boilers, securing the doors on a Burnham Commercial wetback boiler requires no specialized skills or expensive repair materials. It is a simple process which can be done with in-house personnel and performed with minimal downtime.



Anticipated Efficiencies

Natural Gas

Boiler Size	125%		50%		75%		100%	
	10 #	125 #	10 #	125 #	10 #	125 #	10 #	125 #
100	82.5	78.50	83.50	80.50	83.50	81.00	83.50	81.00
125	81.00	77.00	82.00	79.00	82.00	79.50	82.00	79.50
150	82.00	78.00	83.00	80.00	83.00	80.50	83.00	80.50
200	82.50	79.00	83.50	80.50	83.50	81.00	83.50	81.50
250	81.50	78.00	82.00	79.50	82.00	80.00	82.00	80.00
300	82.00	78.50	82.50	80.00	82.50	80.50	82.50	80.50
350	82.50	78.50	83.00	80.50	83.00	81.00	83.00	81.00
400	82.00	78.00	83.00	80.00	83.00	80.50	83.00	80.50
500	82.50	79.00	84.00	81.00	84.00	81.50	84.00	81.50
600	83.00	79.50	84.00	81.00	84.50	82.00	84.50	82.00
700	83.00	79.50	84.50	81.50	84.50	82.00	84.50	82.00
800	83.50	80.00	84.50	81.50	84.50	82.00	84.50	82.00
1000	83.50	80.00	84.50	81.50	84.50	82.00	84.50	82.00

#2 Oil

Boiler Size	125%		50%		75%		100%	
	10 #	125 #	10 #	125 #	10 #	125 #	10 #	125 #
100	85.5	81.50	86.50	83.50	86.50	84.00	86.50	84.00
125	84.00	80.00	85.00	82.00	85.50	82.50	85.50	82.50
150	85.00	81.00	86.00	83.00	86.50	83.50	86.50	83.50
200	86.00	82.00	87.00	84.00	87.00	84.50	87.00	84.50
250	85.00	81.50	85.50	83.00	85.50	83.00	85.50	83.00
300	85.50	81.50	86.00	83.50	86.00	83.50	86.00	83.50
350	85.50	82.00	86.50	84.00	86.50	84.50	86.50	84.50
400	85.00	81.50	86.00	83.50	86.50	84.00	86.50	84.00
500	86.00	82.00	87.00	84.00	87.50	85.00	87.50	85.00
600	86.00	82.50	87.50	84.50	87.50	85.00	87.50	85.00
700	86.50	82.50	87.50	84.50	88.00	85.50	88.00	85.50
800	87.00	83.00	88.00	85.00	88.00	85.50	88.00	85.50
1000	87.00	83.00	88.00	85.00	88.00	85.50	88.00	85.50

Thermal Efficiency

The effectiveness of the boiler as a heat exchanger. It is the ability of the boiler to exchange heat through tubes and furnace, by radiation, conduction and convection, to the transfer medium (water). A few of the factors affecting thermal efficiency are heating surface, tube number and diameter, furnace tube length and diameter.

Combustion Efficiency

This is a measure of the ability of the burner to effectively and completely burn the fuel, coupled with the thermal efficiency of the boiler. Burners requiring high amounts of excess air to provide flame stability will be less efficient. Combustion efficiency does not take into account heat loss to the surrounding air through the boiler jacket and piping.

Fuel-to-Steam Efficiency

Sometimes referred to as overall efficiency. This is a ratio of heat output to heat input. This includes boiler jacket and piping losses to the surrounding environment. It is the percent of usable heat in the steam (or hot water) compared to the heat input supplied by the burner. It is also defined as the combustion efficiency less boiler jacket and piping loss (radiation and convection losses). Since fuel-to-steam efficiency reflects the portion of actual usable heat supplied to the system, it is most useful when comparing performance of similar equipment, or when doing fuel savings analysis.

