



Series 3—Packaged Firetube Boiler



Your Cost Performance Leader

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The Burnham Wetback Packaged Boiler Can Save You Thousands of Dollars Over the Life of Your Boiler.

Burnham quality engineering takes maximum advantage of long-term energy and maintenance efficiencies. Unless you take those efficiencies into consideration along with price when you choose a boiler, you can be in for enormous *hidden costs*.

Boiler Cost is Not Just a First-Year Proposition.

Long after the installation is paid for, fuel, maintenance, and repair costs continue and can increase over the years. Burnham Packaged Boilers are designed to minimize these significant, ongoing ownership costs.

That's Burnham's High Life-Cycle Efficiency!

While most competitive boilers can give fuel-to-steam efficiencies of 80% or over—when they are new—how consistently can they be expected to maintain this level? Burnham wetback boiler performance will not drop due to deteriorating rear refractory, leaking door baffles and seals, and heat-stressed rear tube sheet as can happen with some drybacks: the fact is that easy access is a necessity for those with heavy refractory, as they need frequent, expert maintenance.

The Burnham Wetback Saves Big Money on Maintenance.

Over the life of a dryback, brittle refractory baffling and rear door gasketing will require continual 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 fall 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 Wetback: as it has an *actively functional* water jacket, there is no need for a refractory wall, rear door, rear door inspection and sealing, door swing space in the boiler room, or flue temperature alarm. These costly maintenance headaches are gone, while boiler perfor-



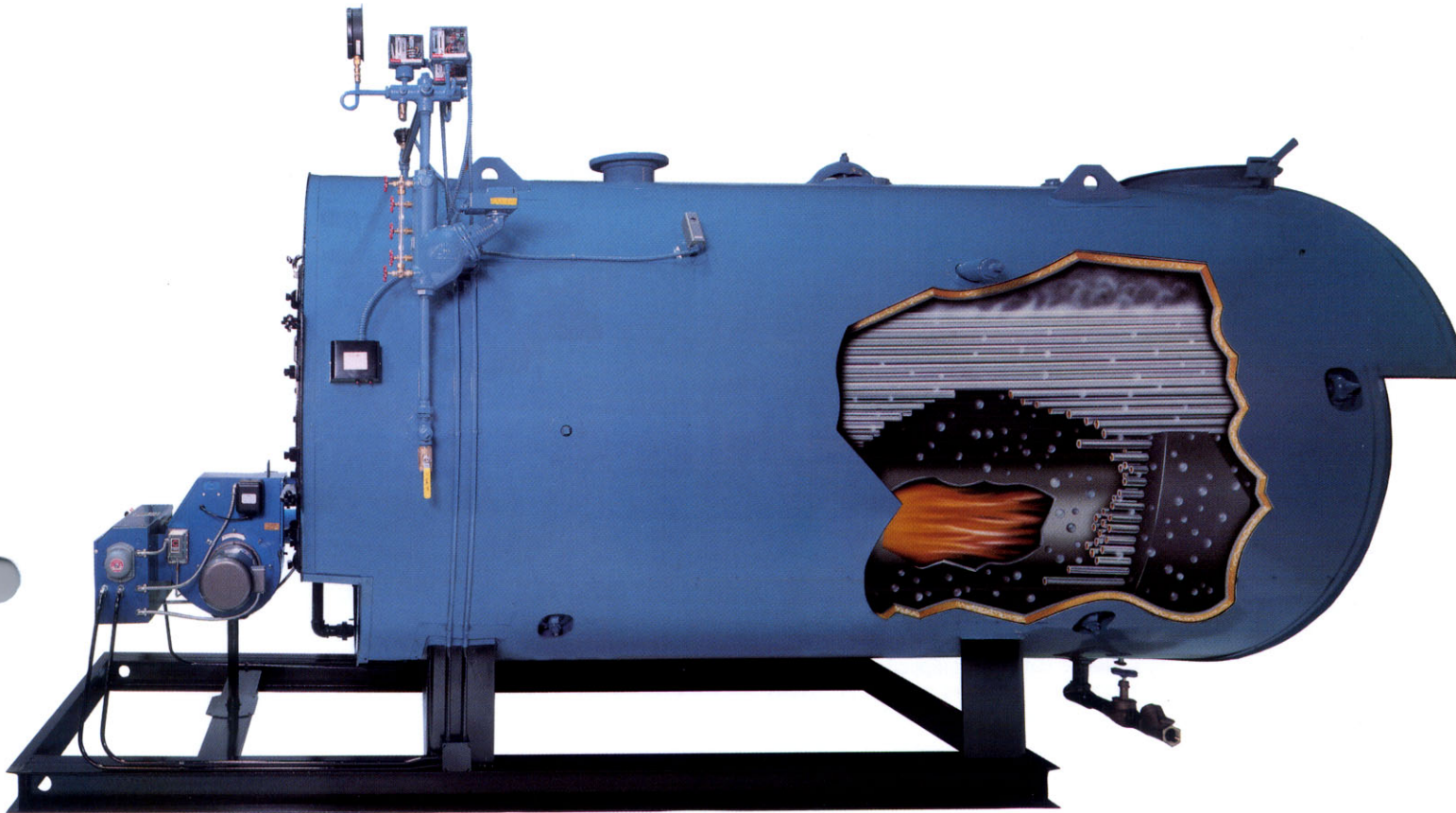
mance is *increased*. Burnham has only a small, inexpensive refractory area in the rear access port. The furnace and rear turnaround area are cool running, fully wetbacked radiant heat transfer surfaces. They promote good internal water circulation and rapid heat absorption. There is no need for the forced internal circulation pumps often specified to cool the rear tube-sheets in drybacks.

The Burnham Wetback is Built to Last.

Typical dryback boilers have a common rear tubesheet which expands and contracts at different rates adjacent to each tube pass, stressing tube ends and increasing the likelihood of leaks. Compounding this problem, the heavy refractory used in some drybacks reflects intense heat to the rear tube ends and tube sheet, accelerating their deterioration. Sometimes, welding of the rear ends of tubes has been done in attempts to stop leaking. 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 also.

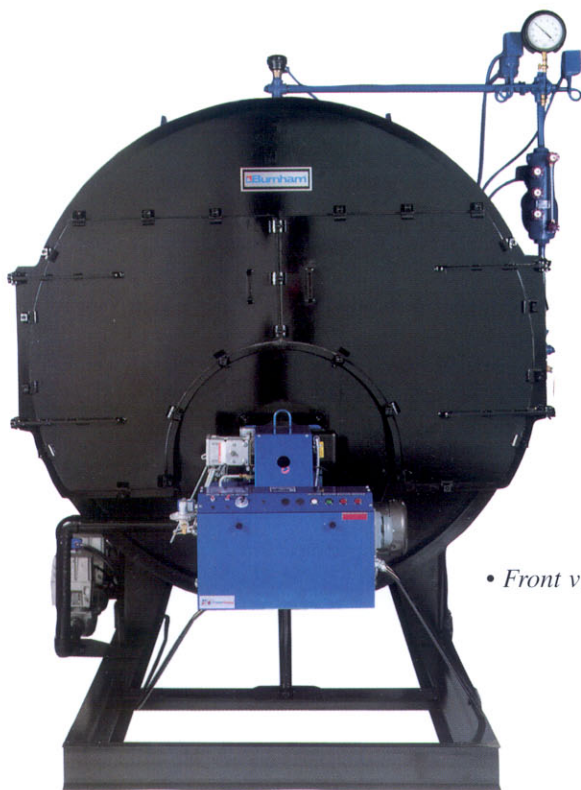
These damages and expenses cannot be incurred with the Burnham Scotch Marine: separate rear tube sheets free each pass to expand and contract at its own rate without tube-to-sheet stress. Tubes are rolled and flared in low pressure units; and rolled, flared and beaded in the high pressure ones. No welding of tubes is permitted, nor is it necessary. Any eventual tube replacement is a mechanical, not a welding operation: uncomplicated and less costly.

- ① Large, Fully Waterbacked Furnace Tube Assures Complete Combustion and Heat Absorption Without Flame Impingement.
- ② Three Gas Passes Extract Maximum Usable Heat From the Fuel While Maintaining Optimum Flow for Forced Draft Firing.
- ③ 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.



RATINGS AND DATA BOILER MODEL NO. 3	40	50	60	70	80	90	100	125	150
Shell Diameter	48	48	48	54	54	54	54	66	66
Gross Output, BHP	40	50	60	70	80	90	100	125	150
Gross Output, MBH	1339	1674	2009	2343	2678	3013	3348	4184	5020
Gross Output, LBS/HR	1380	1725	2070	2415	2760	3105	3450	4313	5170
Net Rating—Steam, MBH	1011	1290	1560	1819	2079	2339	2599	3248	3890
Net Rating—Steam, SQ. FT.	4211	5376	6499	7580	8663	9747	10830	13535	16240
Heating Surface SQ. FT. F.S.	200	250	300	350	400	450	500	625	750
SQ. FT. W.S.	220	280	335	390	445	500	555	695	835
Firing Rate—Gas, MBH	1674	2093	2500	2930	3348	3766	4185	5230	6270
Firing Rate—Oil, GPH (140 MBTU/GAL.:150 MBTU/GAL.)	12/11	15/14	18/17	21/20	24/23	27/25	30/28	38/35	45/40
Furnace Vol., CU.FT.	14.8	17.1	19.3	27.8	30.2	33.0	35.8	41.9	47.0
Water Content—LBS. Operating	1760	2303	2765	3285	3672	4060	4523	5585	6660
LBS. Flooded	2185	2701	3235	4160	4641	5143	5711	6673	7940
Approx. Wt.—Dry, LBS. (15 PSI)	4730	5190	5650	6600	7010	7510	8170	10440	11300
(150 PSI)	5540	6050	6600	8220	8700	9420	10200	12110	13600

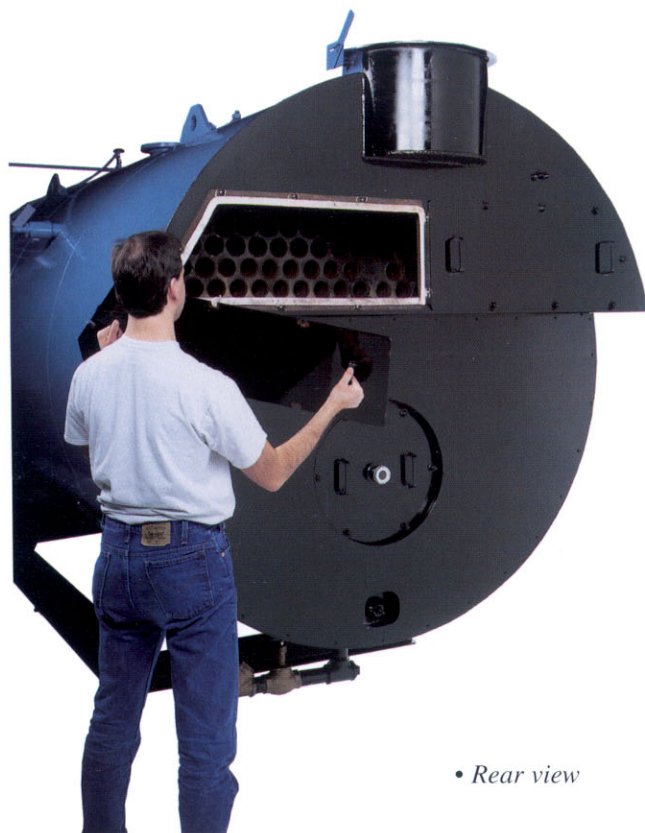
Note: Dimensions and Data are Not for Construction Purposes and are Subject to Change without Notice



• Front view

After the doors have been opened on the Burnham wet-back boiler, there are no specialized skills or expensive repair materials needed to reclose them as with drybacks. Simply tightening the closure bolts reseals the doors. Cleaning can be done inexpensively and the boiler put back on line quickly by your in-house personnel.

Ready access to tubes through rugged front doors and rear covers makes routine cleaning easier and less costly than with drybacks. The burner does not have to be disturbed. There is no inner air baffle door to contend with. There are no delicate, expensive baffle tiles or door seals to replace.



• Rear view

175	200	250	300	350	400	500	600	700	800	900	1000	1200	1500
66	66	78	78	90	90	102	102	102	108	114	114	114	130
175	200	250	300	350	400	500	600	700	800	900	1000	1200	1500
5858	6695	8369	10043	11716	13390	16738	20085	23433	26780	30128	33476	40170	50212
6040	6900	8625	10350	12075	13800	17250	20700	24150	27600	33217	34500	41400	51750
4548	5198	6498	7797	9096	10396	12995	15594	18193	20792	23500	25990	31172	38984
18950	21658	27074	32489	37901	43317	54147	64975	75805	86633	97615	108294	129883	162435
875	1000	1250	1500	1750	2000	2500	3000	3500	4000	4500	5000	6000	7500
970	1110	1360	1630	1900	2175	2715	3260	3805	4349	4905	5430	6550	8154
7333	8369	10461	12500	14645	16738	20923	25106	29319	33475	37660	41846	50213	62765
52/49	60/56	75/70	90/84	105/98	120/112	150/140	180/168	210/196	240/224	269/252	300/280	359/335	450/420
53.1	58.8	86.6	99.1	113.5	124.7	152.0	174.3	195.8	302.3	278	309	351	409
7758	8829	11174	12315	15392	16765	18515	22128	25767	33945	40893	45437	48602	56714
9245	10519	13983	16649	19340	22125	23788	28381	33005	43762	N/A	N/A	N/A	73116
12612	13650	17770	20401	24250	26780	31270	35917	39810	44456	N/A	N/A	N/A	75000
14960	16380	22350	22350	27416	29870	36213	40990	45350	50680	63000	70000	80000	85000

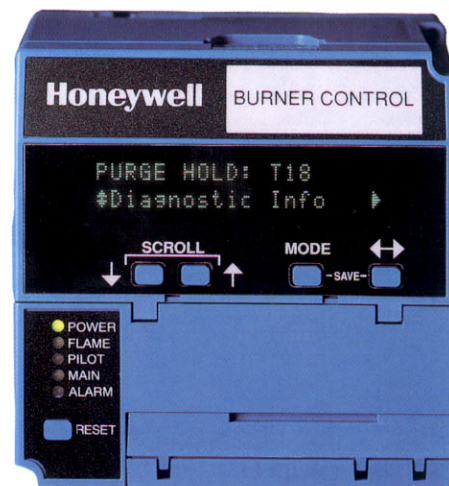
- *Forced-Draft Firing with Oil (No. 2, 4, 5, or 6), Gas, or Combination Gas/Oil.*
- *Low or High Pressure Steam.*
- *Highly Efficient Three-Pass Design.*
- *Fully Waterbacked Primary Heating Surfaces.*
- *Separate Rear Tube Sheets for Longer Service Life.*
- *Wetback Design Allows Easy Front and Rear Access.*
- *No Expensive Refractory or Door Replacement as with some Drybacks.*



It All Adds up to Significant Cost-Performance Advantage

These energy and maintenance features add up to real savings for you. Our design for long-term efficiency and economy of operation makes Burnham Packaged Wetback Firetube your cost-performance leader!

The Series 3 matches burner to boiler, providing a fuel-efficient, low-maintenance package. Maintenance costs can be further controlled in your boiler room with optional accessories. Such options include state-of-the-art annunciator systems, custom-designed to monitor all boiler and burner interlocks vital to your particular installation. They provide instant readout of both normal and abnormal operating conditions, pinpointing any causes for unscheduled shutdowns, and reducing maintenance time and skill required.



Full modulation combustion sequencing, microprocessor burner controls, and first-out annunciator systems available.

Series 3—Standard Equipment

BOILER:

Three pass full wetback, packaged firetube type, constructed in accordance with requirements of the ASME Code, Section IV for 15 psi steam; Section I for higher pressure steam. All units are registered with the National Board.

Boiler tubes are expanded and flared in low pressure boilers; expanded and beaded in high pressure boilers. Turbulator baffles are not used in tubes. Separate second and third pass rear tube sheets allow safe expansion and contraction.

Waterbacked rear turnaround promotes rapid internal circulation and reduces gas temperatures at entrance to second pass, reducing tube end stress.

Easy opening hinged, insulated front flue doors with bolted closure provide full access to all tubes. A 16-inch diameter bolted rear access door with observation port provides access to the boiler furnace. Rear tube access is provided by removing light weight gasketed door(s) installed on the rear smokebox. No elaborate seals are used.

A manhole is furnished as standard on low pressure steam boilers sizes 3-125 and larger; on high pressure steam boilers sizes 3-70 and larger.

Handhole washouts are provided for easy inspection and cleaning of waterside surfaces.

All steam boilers provided with a dry pan to ensure dry steam. A feedwater diffuser is provided on high pressure boilers.

The round flanged vertical smoke outlet is equipped with a locking quadrant damper. All boilers are provided with an enameled steel jacket over 2 inches of fiberglass insulation, and lifting lugs.

The boiler is mounted on a heavy duty structural steel base with extended skid and burner platform for protection of the burner during shipment and rigging.

STANDARD TRIM AND CONTROLS:

Steam: 157 pump control/low water cut-off with alarm contacts—piped with quick opening blowoff valve. Gauge glass set with hand-operated gauge and try cocks. Steam pressure gauge—4 1/2 inch dial on sizes 100 hp and smaller, 6 inch dial on larger sizes. L404A operating pressuretrol, L404C manual reset high limit pressuretrol and appropriate firing rate control when required. Manual reset probe auxiliary low water cut-off.

ASME side outlet safety valve(s).

BURNER EQUIPMENT:

Burner mounts directly to front head of boiler with no elaborate seals.

Factory packaged units available with forced draft burners for all commonly used fuels—gas, all grades of oil—No. 2 through No. 6—and combination gas/oil. Choice of pressure or air atomizing burners for No. 2 oil—air atomizing on heavy oil. Gas burners are available for either natural or LP gas.

Refer to burner data sheets for standard burner equipment and operating sequence.

ACCESSORIES AND OPTIONAL EQUIPMENT:

Accessories and optional equipment available at extra cost, including, but not limited to:

- Solid-state annunciators.
- Alternate or additional water level controls or low water cut-offs.
- Built-in tankless heater coils — low pressure boilers only.
- Motorized or pneumatic feed valves.
- Surface skimmers and blowoff valves.
- Bottom blowdown valves and drain valves.
- Feed stop and check valves.
- Sequence draft controls.
- Lead/lag sequencing systems.
- Boiler feed systems.
- Low NOx burners.



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