HEROS

Water-tube Boilers

steam generation systems for process and power

B&W

ENERGY | ENVIRONMENTAL
Babcock & Wilcox (B&W) is a global leader in supplying a wide range of industrial water-tube boiler designs to meet targeted, challenging, long-lasting operational and performance goals. Our Heros™ industrial boilers are custom-engineered to each project’s unique specifications for varying inputs and desired outputs. All of our designs feature the highest levels of quality, reliability and efficiency for which B&W is known.

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Evolution of B&W’s Heros boilers

More than 2,000 years ago, a Greek mathematician and scientist named Hero designed a device that used steam as a power source. His invention, the aeolipile, is credited as being the first steam engine. In 1856, Stephen Wilcox built upon Hero’s science to engineer and patent the water-tube boiler for use in industry. His success led him to team up with childhood friend George Babcock and establish The Babcock & Wilcox Company and begin a legacy of innovation in steam generation that continues today.

Over the years, B&W's industrial boiler configurations have been known by various model names, including FM, HCFM, PFM, PFI, PFT, TSSG and others — D-type or O-type, single-drum or multi-drum. While the unique designs offered by these various models will continue to be offered, they are now all known under the Heros industrial boiler name.

Today, B&W's line of Heros industrial boilers represents more than 150 years of ingenuity and experience, all providing dependable performance for a wide range of industries and applications.
Heros industrial boilers offer:

- Reliable steam generation
- Low auxiliary power requirements
- Low emissions
- Simple operation and low maintenance
- Operational flexibility – high turndown and fast load ramping

Custom configurations meet targets for:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
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<tbody>
<tr>
<td>Capacity</td>
<td>10,000 to 1,200,000 lb/hr (4.5 to 544.2 t/hr)</td>
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<tr>
<td>Size/Space</td>
<td>Various designs for shop and/or modular field assembly to fit most any space limitations</td>
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<tr>
<td>Temperature</td>
<td>Saturated to 1005F (540C)</td>
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<tr>
<td>Design Pressure</td>
<td>250 to 2400 psig (1.7 to 16.5 MPa)</td>
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<td>Fuel</td>
<td>Liquid or gaseous fuels such as oil, natural gas, CO, blast furnace gas (BFG), coke oven gas (COG), and various other byproduct liquid and gaseous fuels</td>
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<tr>
<td>Air/Water Treatment</td>
<td>Emissions and water-side deposition control systems</td>
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<tr>
<td>Timeline/Budget</td>
<td>Ability to optimize and expedite to meet cost and scheduling expectations</td>
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More than 5,000 Heros industrial boilers have been installed in a variety of facilities, including:

- Refining and petrochemical
- Utility power
- Pulp and paper
- Chemical and pharmaceutical
- Universities and institutions
- Food processing
- Metals and mining
- Composite and carbon fiber
- Carbon black
- Wood products
- and many more

For firing solid fuels such as pulverized or stoker coal, wood, bark, and bagasse or other biomass products, we offer Stirling™ and/or Towerpak™ model boilers.
B&W Innovation

Developing firsts that last is a cornerstone of our company. Having earned more than 17,000 patents, we are committed to technological innovation that provides measurable benefits.

A few innovations that our Heros industrial boilers can include are multi-circulation systems, connection-ready installations and elevated-drum designs.

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**MultiCirc (patent-pending)**

Our multi-circulation systems accommodate lower-quality feedwater and maximize thermal efficiency while maintaining reliability by minimizing boiler tube internal scaling.

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**Connection Ready**

The boiler and auxiliary equipment modules, depending on size, can be shop mounted to skids where they are pre-wired and piped to accelerate transporation and reduce field installation times.

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**Elevated Drum**

Our elevated-drum design is used for drum retention times of 5 minutes or more from normal water level to low water fuel cutout. Additionally, this design is utilized where shipping limitations exist as it allows for a more symmetrical load with the upper steam drum shipped separately from the boiler and installed onsite.
Proven Experience

Elevated three-drum unit for IRPC Clean Power Co., Ltd. in Rayong, Thailand

To meet the project’s steam drum retention requirements, we engineered and delivered an elevated three-drum unit for the combined heat and power plant’s use in supplying steam to a neighboring factory.

High-capacity unit for U.S. refinery

We engineered and supplied a 300,000 lb/hr (136,100 kg/hr) shop-assembled unit, which was shipped by barge and field-installed. The project scope also included all boiler auxiliaries, fans, economizer, valves, instrumentation and installation of all equipment on the boiler island.

Single-drum modular units for oil sands project in Alberta, Canada

Challenged to provide a solution for highly reliable steam generation at high pressure with ultra-low NOx emissions, minimized blowdown for zero liquid discharge requirements, multi-fuel usage, and low field erection and maintenance costs, we supplied eight high-performing modularized single-drum units.

Custom-branded units for U.S. universities

In addition to predefined specifications for operating conditions, our Heros industrial boilers can be delivered featuring designated colors and logos. We recently supplied two U.S. universities with multiple custom-branded units, each capable of providing approximately 80,000 lb/hr (36,300 kg/hr) of saturated steam with a design pressure of 250 psig (1.7 MPa).

More than 5,000 installations in more than 60 countries
Design Features

Our Heros water-tube boilers offer numerous features that benefit your operations, including:

- Furnace wall water cooling – eliminates refractory and related maintenance
- Gas-tight setting membrane – inhibits dew-point sulfur corrosion and outages caused by gas leaks
- Rugged steel-based frame – supports boiler and allows jacking and skidding
- Outer lagging – galvanized, weather-tight for outdoor installations
- Drum internals – ensure positive circulation, low-moisture, high steam purity

- Water wash troughs and drains
- Grooved tube seats – protect against leaks during transportation and throughout operation
- Solid membraned division wall – prohibits furnace gases from bypassing generating tubes
- Larger tube diameter – helps to prevent membrane thermal cracking and contributes to a faster load response
- Inverted loop, fully drainable superheaters
Services

- Engineering studies
- Proprietary computational fluid dynamics (CFD) modeling and circulation analysis
- Equipment design, tuning and testing
- Stress analysis and graphics
- Transportation and logistics
- Turnkey installation and construction services
- Field advisory services for start-up, commissioning, equipment installation and operator training
- Retrofits and replacement parts
- Responsive global network of sales and field engineers to provide expert service and support

Codes and standards

Each project is reviewed to meet customer requirements and all applicable ASME and industry codes. Additional design standards typically provided are ANSI, API, PIP, SIL, UL, CSA and NFPA. B&W will meet or exceed most any requirement requested.

Auxiliary equipment

- Economizers
- Burners
- Controls
- Forced draft fan and drives
- Flues and ducts
- Stacks
- Deaerators, feedwater pump sets
- Oil pumps
- Heater sets
- Post-combustion emissions control systems
- Code piping
- Balance of plant
Reliability is standard. Everything else can be customized.

Our Heros industrial water-tube boilers can be found in utilities, mills, refineries, universities, institutions, mines and other industrial facilities across the globe. They are engineered to meet unique capacity, space, fuel, emissions, transportation, installation and other requirements. Built to spec, and built to last.