Heat Recovery Steam Generators

A natural circulation design with true fast startup capabilities

Experience reliability
Maximize energy efficiency
Building on more than 145 years of experience in steam generation, Babcock & Wilcox (B&W) combines our proven industry experience and expertise in thermal technology to provide advanced Heat Recovery Steam Generator (HRSG) technology.

B&W and our licensees have supplied over 300 HRSGs worldwide, since designing and supplying our first waste heat recovery boilers in the 1950s. Today, we can provide reliable systems suitable for combustion turbines ranging from 10 MW to more than 250 MW.
HRSG design features

- Optimized circulation system improves reliability
- Fast startup and rapid response capabilities utilizing flexible harps and patented FastCirc™ vertical separator
- Customized for combined cycle or cogeneration
- Vertical tube, natural circulation design simplifies operation
- Combustion turbine capacity ranging up to 250 MW or more
- One, two or three pressure levels with or without reheat
- Supplemental and auxiliary firing for additional steam production or stand-alone operation
- Reduced construction cost and schedule through shop-assembled modules for utility-scale HRSGs and pre-assembled industrial HRSGs

Reliable, low maintenance operation • Fast startup capabilities • Designed for constructability
Through B&W’s FastCirc™ vertical separator system, you benefit from the same fast startup capabilities of a once-through steam generator design, with the ease of operation, flexibility and cost advantages of a natural circulation design.

High pressure steam drum soak time remains a limiting factor in the startup ramp rate of HRSGs. B&W’s patented FastCirc system eliminates the need for a high pressure steam drum and its limitations.

The FastCirc system is supported at approximately the same elevation as the upper tube bundle headers. This allows the system to expand downward as a unit. This parallel expansion, along with reduced wall thickness, minimizes stress loads in the shell and at nozzle connection points. The tangential entry of the riser piping into the vertical separator acts as an integral primary steam and water separator, eliminating the need for expensive drum internals. With the addition of secondary mechanical separators, the same steam purity as a traditional drum can be expected.
Evaporator circulation
Proper evaporator circulation design is essential for long-term HRSG reliability. We apply our knowledge and experience in circulation design to eliminate issues such as tube starvation and uneven waterside distribution, and significantly reduce the potential for flow-accelerated corrosion in riser pipes.

Our engineers design HRSGs to maintain nucleate boiling conditions within evaporator tubes. By staying in this region, tubes are not subject to overheat conditions that could result in creep rupture, high tube-to-header weld stress and reduced performance.

Finite element analysis and dynamic modeling
B&W extensively analyzes the design of harps and tube bundles for dynamic scenarios such as cycling applications and fast startup operation. Our engineers perform fatigue analysis of major components such as tubes, headers, interconnections and vertical separator(s), to confirm the durability of components for two-shift operations during the design life of the HRSG. Consideration is given to draining and drum/separator swell, and their effect on long term reliability.

Material sciences
We continue to successfully bring together cross-disciplinary teams from many technical specialties. Our highly-skilled researchers, engineers, and scientists work closely together to develop innovative HRSG design solutions for current and future challenges.

B&W materials sciences experts have decades of experience manufacturing and welding advanced alloys, including T91 and T23 materials.
Shop-fabricated industrial HRSGs

Our use of proven constructability methods means no surprises during the installation. We consider important measures affecting erection time and costs including crane sizes and elevation requirements for proper drain designs. Industrial size HRSGs can be shop assembled and delivered direct to the site, resulting in the shortest lead time and erection time. Fully shop-assembled units or large assemblies are available for industrial HRSGs with a gas turbine exhaust flow up to 300,000 lb/hr.

Construction integration

As a single-source turnkey supplier of a full range of field construction, construction management and maintenance services, Babcock & Wilcox Construction Co., Inc., a subsidiary of B&W, is experienced in the construction of simple and combined cycle gas turbine plants. Overall project cost and schedule are minimized through HRSG modular components and construction integration with material supply.

Modular components

- Large module boxes of pre-assembled components reduce field labor costs and erection time
- Tube bundle assemblies simplify lifting and limit large construction crane requirements
- Pre-assembling of casing panels and structural steel is maximized to reduce on-site labor requirements

Designed for constructability
Single-source solutions

**Emissions monitoring**
To help you meet regulatory demands and industry requirements, we offer a comprehensive line of emission monitoring systems backed by superior service. Air quality data gathering and reporting is simplified through our extensive portfolio of low source level emission monitoring solutions and ammonia slip monitoring systems. Our hardware and software packages are supplemented with services such as installation supervision, regulatory review and consulting, maintenance, training and 24/7 support.

**Replacement parts and upgrades**
We offer a wide range of HRSG replacement parts, upgrades and services to keep your unit operating efficiently and reliably.

- Tube bundle replacement
- Vertical separator retrofit
- Drum replacement
- Tube and header repairs
- Casing modifications

**Operations and maintenance**
Through our subsidiary, Delta Power Services, LLC (DPS), we have extensive plant operations and maintenance experience with a wide range of fuels, equipment and operating conditions. DPS consistently delivers safe and efficient operations, plant reliability levels well above the industry average, and on-peak availability factors in the highest percentiles.
Established in 1867, Babcock & Wilcox is a global leader in advanced energy and environmental technologies and services for the power and industrial markets, with operations, subsidiaries and joint ventures worldwide.

For more information, or a complete listing of our sales and service offices, send an e-mail to info@babcock.com, or access our website at www.babcock.com.

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Single-source HRSG solutions
B&W provides single-source HRSG solutions to deliver a superior product at a competitive price. From equipment design and manufacturing, to construction and field engineering services, B&W can put it all together.

► Design and manufacturing
► Field services, inspections and diagnostics
► Engineered upgrades and replacement parts
► Outage support
► Plant operations and maintenance
► Emissions monitoring
► Construction, startup and commissioning
► Training programs