



Quality Products for Power and Industry


Boilers and Steam Generating Equipment

Environmental Equipment

Auxiliary Equipment



RENEWABLE | ENVIRONMENTAL | THERMAL



Since 1867, Babcock & Wilcox (B&W) has designed and manufactured high-quality, high-value power and steam generation, environmental and auxiliary power plant equipment that delivers outstanding performance year after year. Our vision *To be innovators and partners, trusted for excellence* is based on our core values of safety, integrity, quality, respect and agility. We are committed to excellence in everything we do by delivering outstanding customer service and environmentally conscious, technology-driven solutions to energy and industrial customers worldwide — safely, ethically and as promised. This mission is the framework for our future, as we continue to provide an ever-increasing range of products and services.

This brochure provides a summary of both our mature designs as well as our latest engineering achievements.

Designs and information shown in this brochure are for illustration purposes only. Equipment designed for specific applications may differ. All possible equipment arrangement variations are not included herein.

Boilers and Steam Generating Equipment..... pg 4

B&W's steam generation equipment is designed for high reliability, availability and efficiency, and can accommodate a wide range of energy sources.

- Spiral Wound Universal Pressure (SWUP™) Boiler
- Universal Pressure (UP®) Boiler
- Vertical Tube Universal Pressure (VTUP™) Boiler
- Radiant Boiler — Carolina-type (RBC)
- Radiant Boiler — El Paso-type (RBE)
- Radiant Boiler — Tower-type (RBT)
- Radiant Boiler — Downshot
- Stirling® Power Boilers
- Circulating Fluidized-Bed (CFB) Boiler
- Bubbling Fluidized-Bed (BFB) Boiler
- Towerpak® Boiler
- Water-tube Package Boiler
- Water-tube Industrial Boiler
- Industrial Boiler Design Options
- Process Recovery (PR) Boiler
- Reheat Recovery Boiler
- Waste-to-Energy Boilers

Environmental Equipment..... pg 22

B&W successfully develops and deploys advanced technologies designed to reduce the environmental impact of a wide range of emissions.

- Wet Flue Gas Desulfurization (FGD) Scrubber
- Spray Dryer Absorber (SDA)
- Circulating Dry Scrubber (CDS)
- Dry Sorbent Injection (DSI)
- Mercury Control
- Pulse Jet Fabric Filter
- Horizontal Wet Electrostatic Precipitator (ESP)
- Dry Electrostatic Precipitator (ESP)
- Selective Catalytic Reduction (SCR)

Auxiliary Equipment..... pg 31

B&W provides proven boiler and power plant auxiliary components which operate with the same reliability as our steam generating equipment.

- B&W Roll Wheel™ Pulverizer
- EL Pulverizer
- AireJet® Low NO_x Coal Burner
- DRB-4Z® Low NO_x Coal Burner
- XCL-S® Low NO_x Oil and Gas Burner
- Dual Zone NO_x Port (Overfire Air System)
- Wall-Fired Oil and Gas Igniters
- Horn Oil and Gas Igniters
- Cyclone Furnace
- Diamond Power® Boiler Cleaning Equipment
- Allen-Sherman-Hoff® Ash Handling Systems
- Controls, Diagnostics and Plant Optimization Systems

Spiral Wound Universal Pressure Boiler SWUP™

Design features

A once-through boiler for supercritical applications, usually applied to systems with a capacity of 400 MW or larger; the design features a water-cooled dry-bottom furnace, superheater, reheater, economizer, and air heater components — designed for both base load and full boiler variable pressure load cycling operation as well as on/off cycling operation.

Capacity, steam output

From 2,000,000 lb/h (252 kg/s) to more than 10,000,000 lb/h (1260 kg/s)

Operating pressure

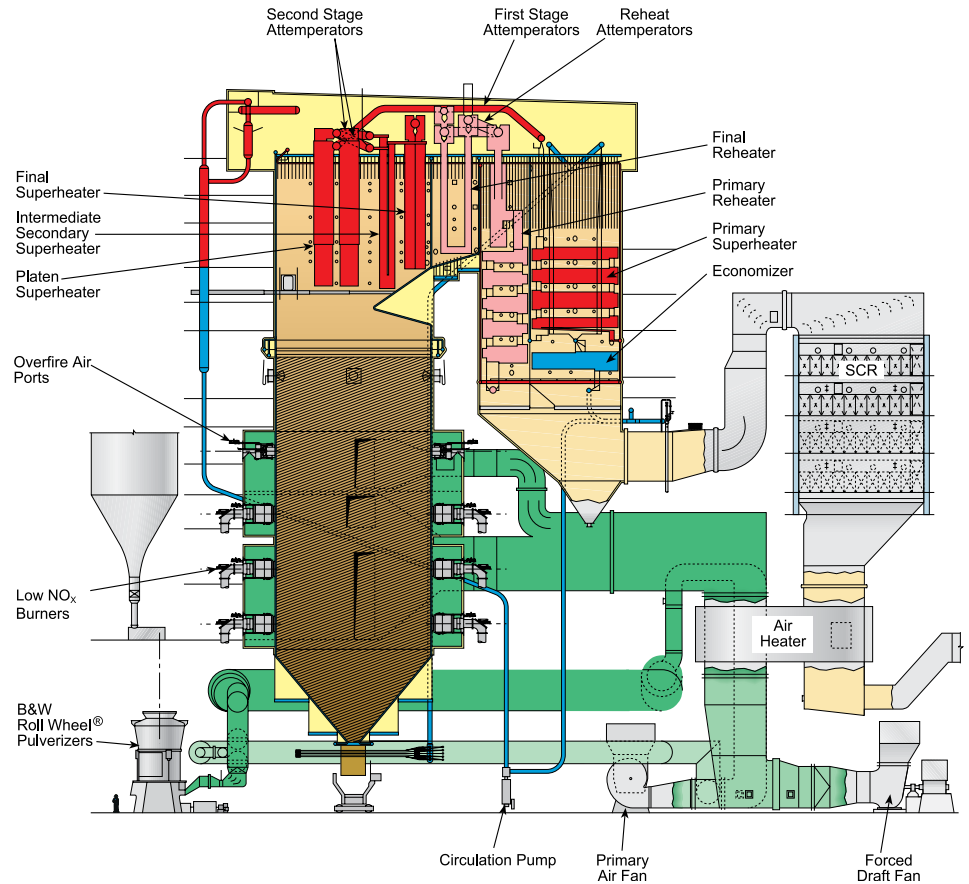
Supercritical, usually at 3500 psi (24.1 MPa) throttle pressure with 5% overpressure; higher pressures available

Superheater steam temperatures

As required, currently in the 1100F (595C) range

Fuels

Pulverized coal



Universal Pressure Boiler

UP[®]

Design features

A once-through boiler for supercritical applications, usually applied to systems with a capacity of 400 MW or larger; the design features a water-cooled dry-bottom furnace, superheater, reheater, economizer, and air heater components — designed for variable superheater pressure load cycling and base load operation.

Capacity, steam output

Typically 2,000,000 lb/h (252 kg/s) to more than 10,000,000 lb/h (1260 kg/s)

Operating pressure

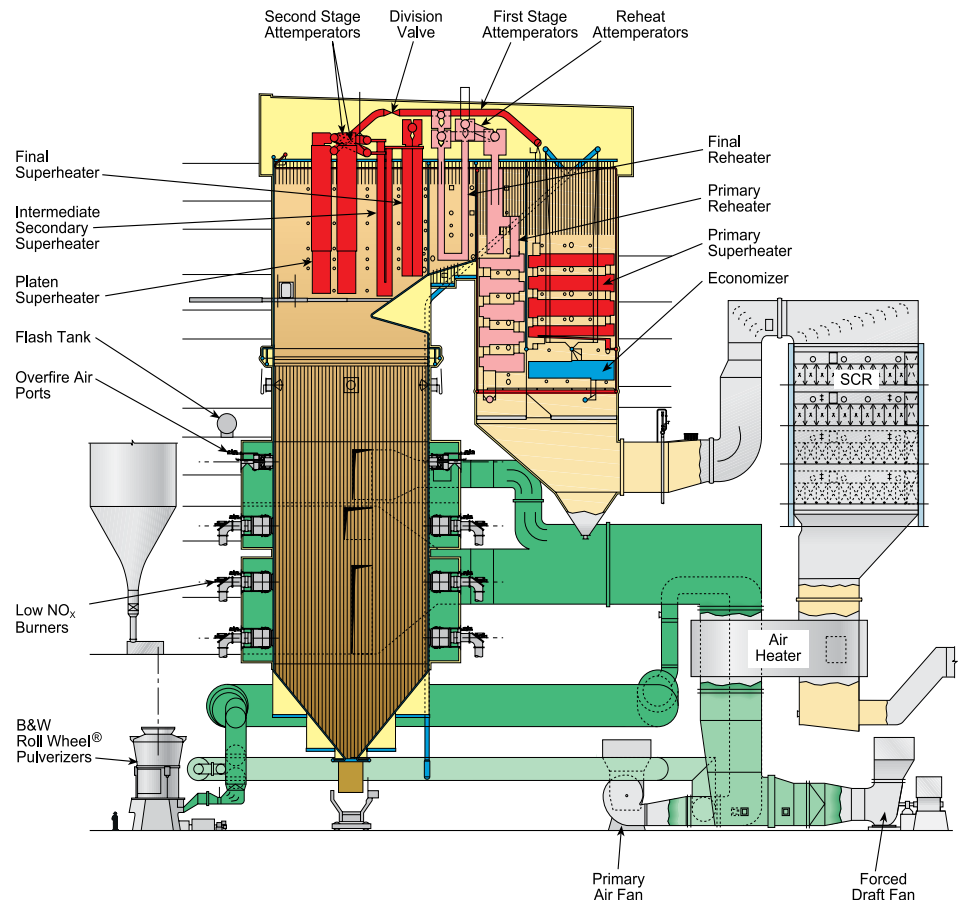
Supercritical, usually at 3500 psi (24.1 MPa) throttle pressure with 5% overpressure

Superheater steam temperatures

As required, currently in the 1100F (595C) range

Fuels

Pulverized coal



Vertical Tube Universal Pressure Boiler

VTUP™

Design features

A once-through boiler for supercritical applications, usually applied to systems with a capacity of 400 MW or larger; the design features a water-cooled dry-bottom furnace, superheater, reheater, economizer, and air heater components — designed for both base load and full boiler variable pressure load cycling operation as well as on/off cycling operation.

Capacity, steam output

From 2,000,000 lb/h (252 kg/s) to more than 10,000,000 lb/h (1260 kg/s)

Operating pressure:

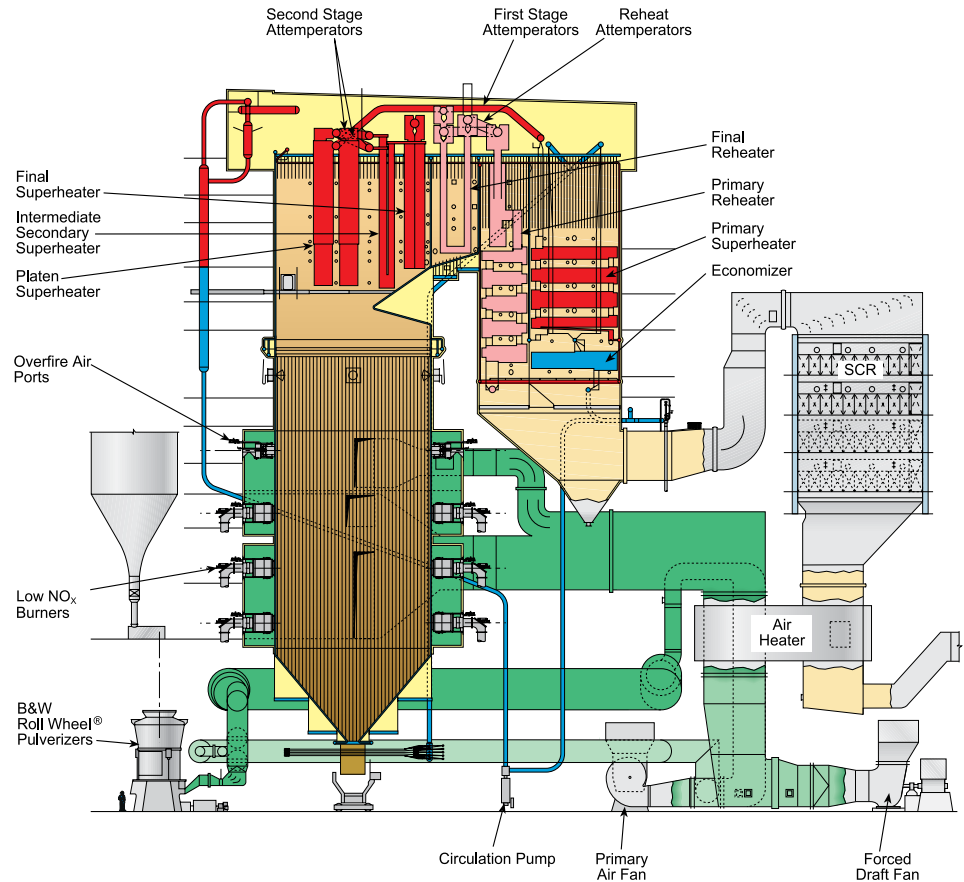
Supercritical, usually at 3500 psi (24.1 MPa) throttle pressure with 5% overpressure; higher pressures available

Superheater steam temperatures

As required, currently in the 1100F (595C) range

Fuels

Pulverized coal



Radiant Boiler — Carolina Type RBC

Design features

Arranged with a natural circulation, water-cooled dry-bottom furnace, and superheater, reheater, economizer and air heater components — the Carolina design employs a horizontal convection pass and vertical pendant heat transfer surfaces.

Capacity, steam output

About 700,000 lb/h (88 kg/s) to a maximum that may exceed 7,000,000 lb/h (880 kg/s)

Pressure

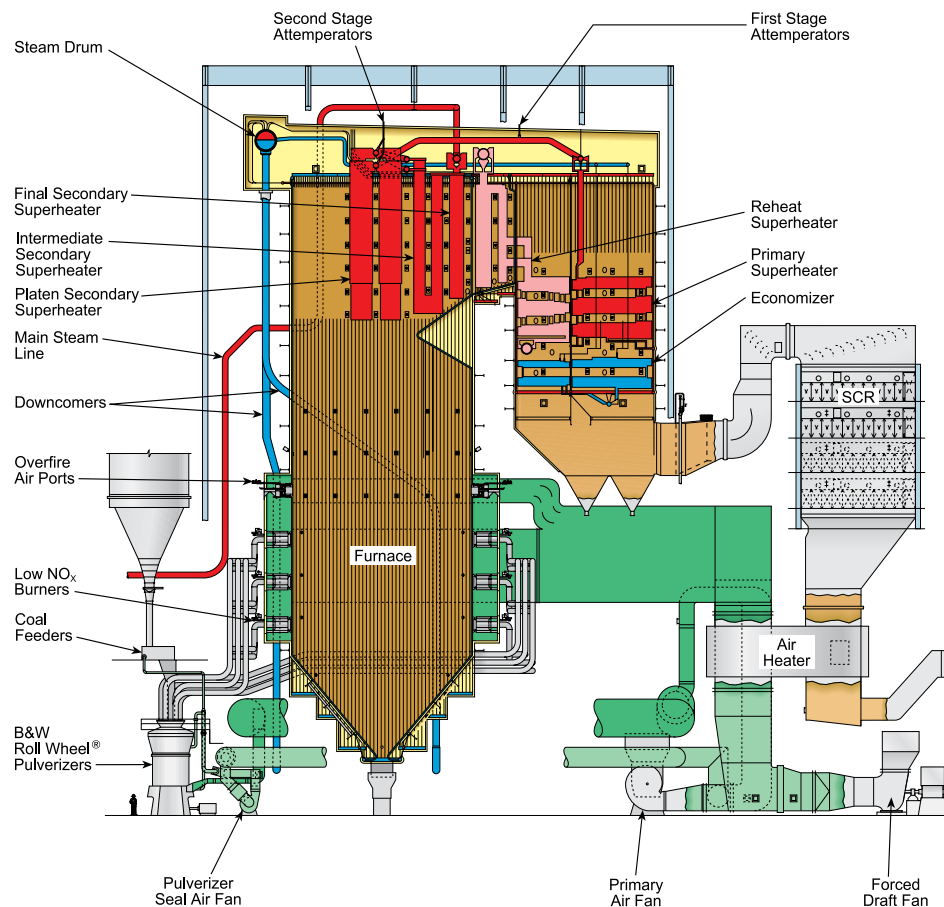
Subcritical, usually 1800 to 2600 psi (12.4 to 17.9 MPa) throttle pressure with 5% overpressure capability.

Superheater and reheater outlet temperatures

As required, usually in the range of 1000 to 1050F (538 to 566C)

Fuel:

Pulverized coal



Radiant Boiler — El Paso Type RBE

Design features

Arranged with a water-cooled hopper-bottom furnace, and superheater, reheater, economizer and air heater components — the El Paso unit provides a compact design which includes upflow and downflow horizontal convection passes.

Capacity, steam output

About 700,000 lb/h (88 kg/s) to a maximum that may exceed 7,000,000 lb/h (880 kg/s)

Pressure

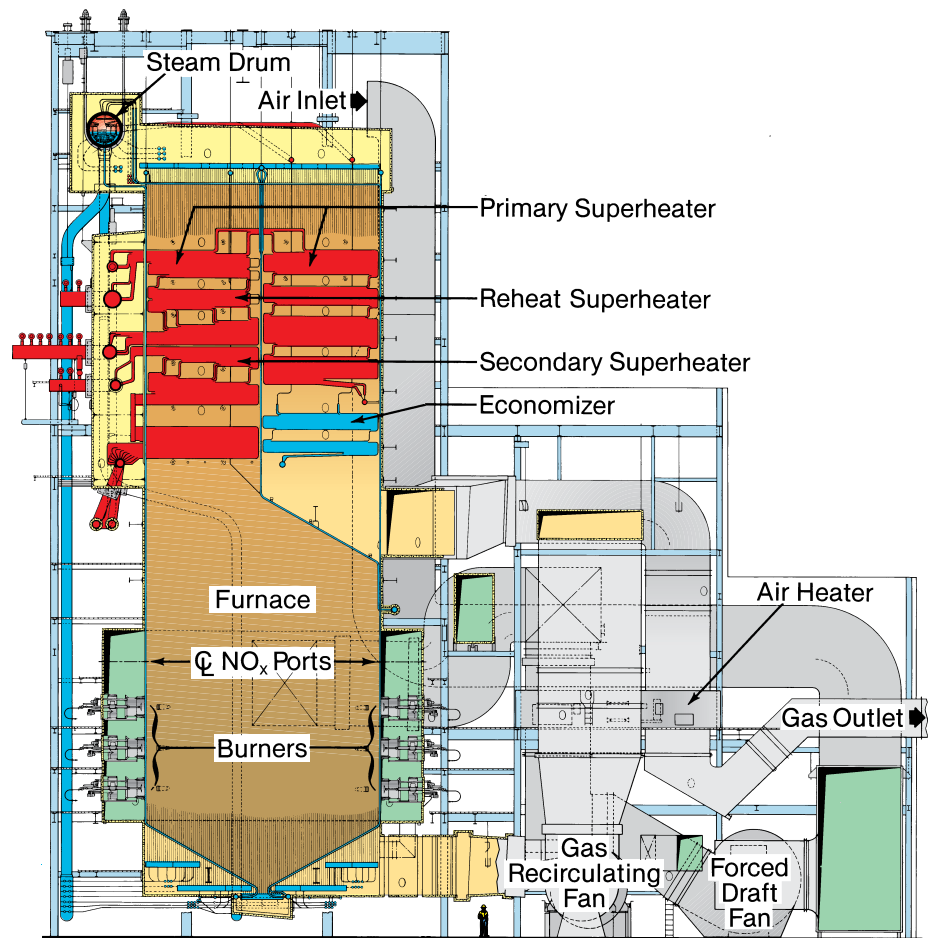
Subcritical, usually 1800 to 2600 psi (12.4 to 17.9 MPa) throttle pressure with 5% overpressure capability

Superheater and reheater outlet temperatures

As required, usually in the range of 1000 to 1050F (538 to 566C)

Fuels

Natural gas and/or oil, blast furnace gas, and combustible byproduct gases



Radiant Boiler — Tower Type

RBT

Design features

Arranged with a water-cooled dry-bottom furnace, and superheater, reheater, economizer and air heater components — the Tower design employs all horizontal convection surfaces.

Capacity, steam output

About 700,000 lb/h (88 kg/s) to a maximum that may exceed 7,000,000 lb/h (880 kg/s)

Pressure

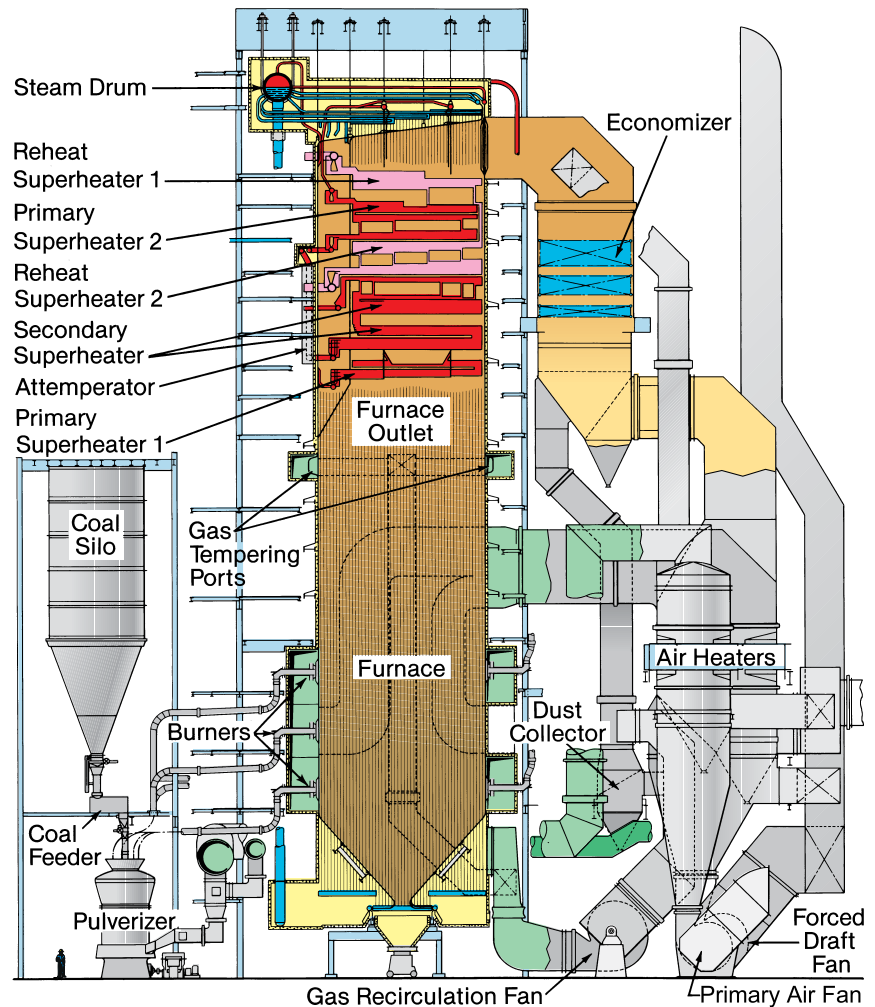
Subcritical, usually 1800 to 2600 psi (12.4 to 17.9 MPa) throttle pressure with 5% overpressure capability

Superheater and reheater outlet temperatures

As required, usually in the range of 1000 to 1050F (538 to 566C)

Fuels

Pulverized coal, natural gas, oil



Radiant Boiler — Downshot

Design features

Arranged with a water-cooled dry-bottom furnace, and superheater, reheater, economizer and air heater components — the Downshot design features an enlarged, refractory-lined furnace for low rank coals resulting in a hotter furnace to sustain combustion.

Capacity, steam output

About 700,000 lb/h (88 kg/s) to a maximum that may exceed 7,000,000 lb/h (880 kg/s)

Pressure

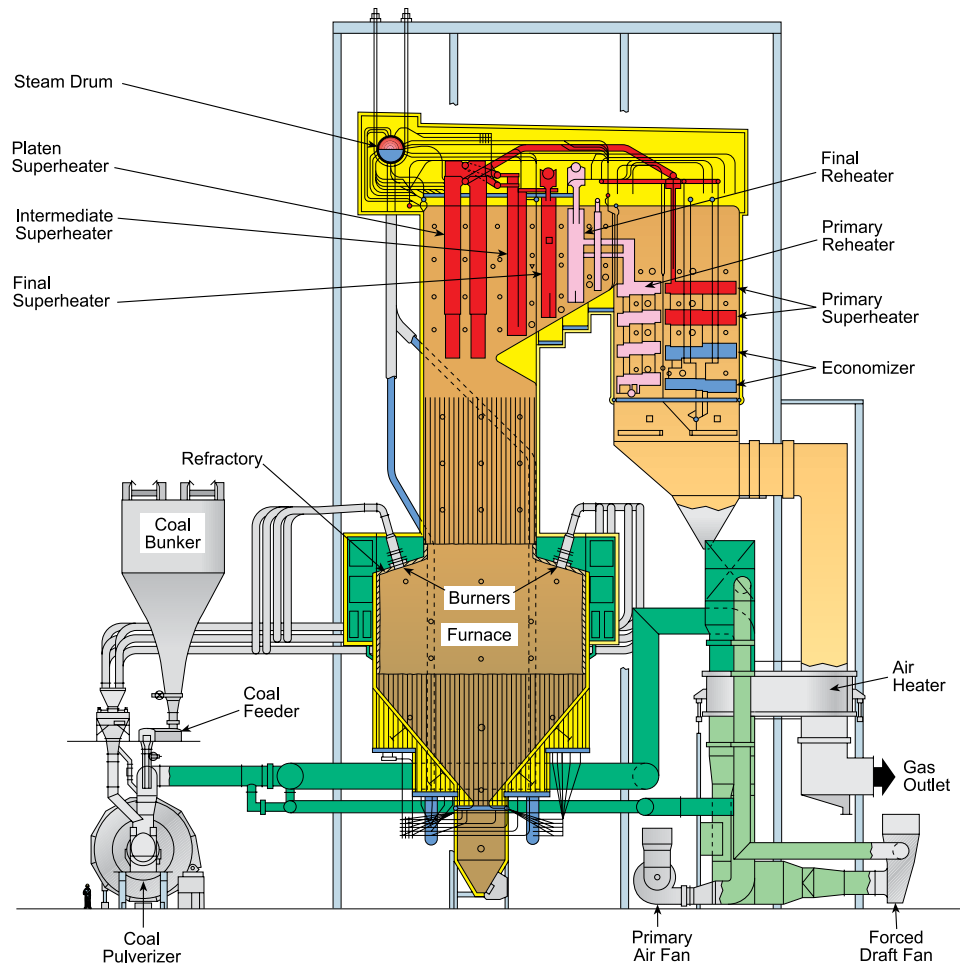
Subcritical, usually 1800 to 2600 psi (12.4 to 17.9 MPa) throttle pressure with 5% overpressure capability

Superheater and reheater outlet temperatures

As required, usually in the range of 1000 to 1050F (538 to 566C)

Fuels

Coals with low volatile matter content, particularly anthracites, that are difficult to ignite and burn



Stirling® Power Boilers

Design features

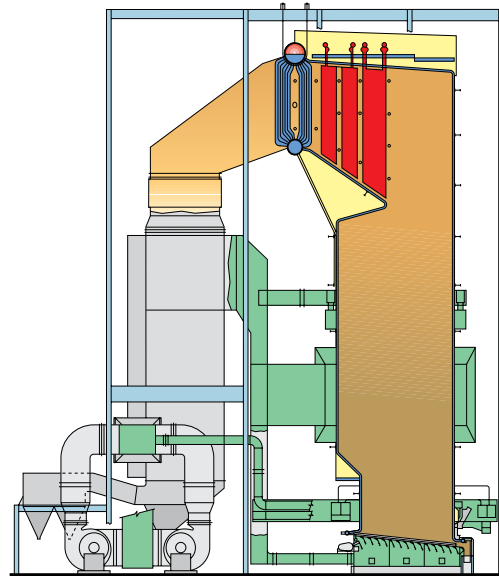
Top- or mid-supported, one- or two-drum, single gas pass unit, pressurized or balanced draft operation, with membrane wall construction, furnace nose arch, and economizer and/or air heater for economical heat recovery.

Capacity

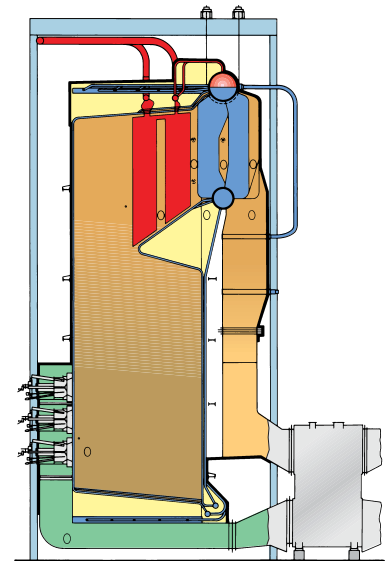
Pulverized coal, oil, gas:
80,000 to 1,200,000 lb/h
(10.1 to 151.2 kg/s)

Stoker coal:
60,000 to 400,000 lb/h
(7.6 to 50.4 kg/s)

Stoker wood, bagasse, biomass:
80,000 to 900,000 lb/h
(10.1 to 113.4 kg/s)



Two-Drum Stirling Boiler with Traveling Gate Firing Biomass and Pulverized Coal



Two-Drum Stirling Boiler Firing Liquid and Gaseous Fuels

Steam pressure

One-Drum: To 2200 psig (15.2 MPa)

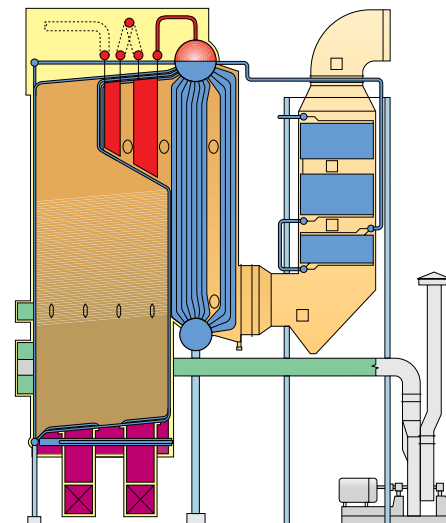
Two-Drum: To 1800 psig (12.4 MPa)

Steam temperature

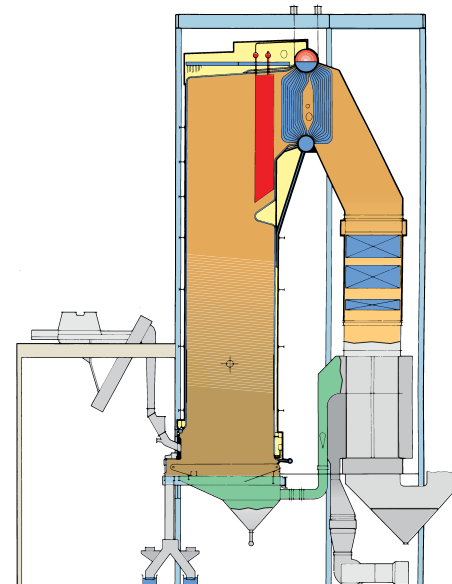
To 1000F (538C)

Fuels

Solid, liquid or gaseous fuels such as pulverized and stoker coal, oil, natural gas, wood, bark, bagasse and other biomass, CO, blast furnace gas (BFG), coke oven gas (COG), and various other byproduct solid, liquid and gaseous fuels



Two-Drum Stirling Boiler for Incinerating Carbon Monoxide (CO) Off-Gas



Two-Drum Stirling Boiler for Stoker Coal and/or Biomass Firing

Circulating Fluidized-Bed Boiler CFB

Design features

Top-supported design; uses normally difficult to burn fuels in a circulating bed of inert particles to control the combustion process and gaseous emissions such as NO_x and SO₂; a two-stage solids collection system is utilized consisting of U-beam particle separators where most of the solids are collected and internally recirculated to the furnace while the remaining solids are collected at and recycled from a multi-cyclone dust collector; an internal fluid-bed heat exchanger (IBHX) is utilized for load-following capability.

Capacity

To 2,200,000 lb/h (277 kg/s) or greater as required

Steam pressure

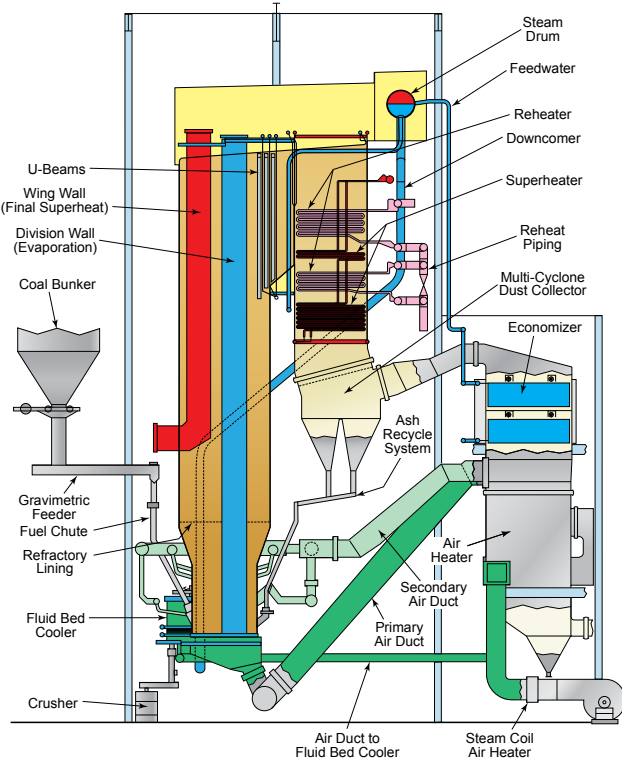
To 2600 psig (17.9 MPa)

Steam temperature

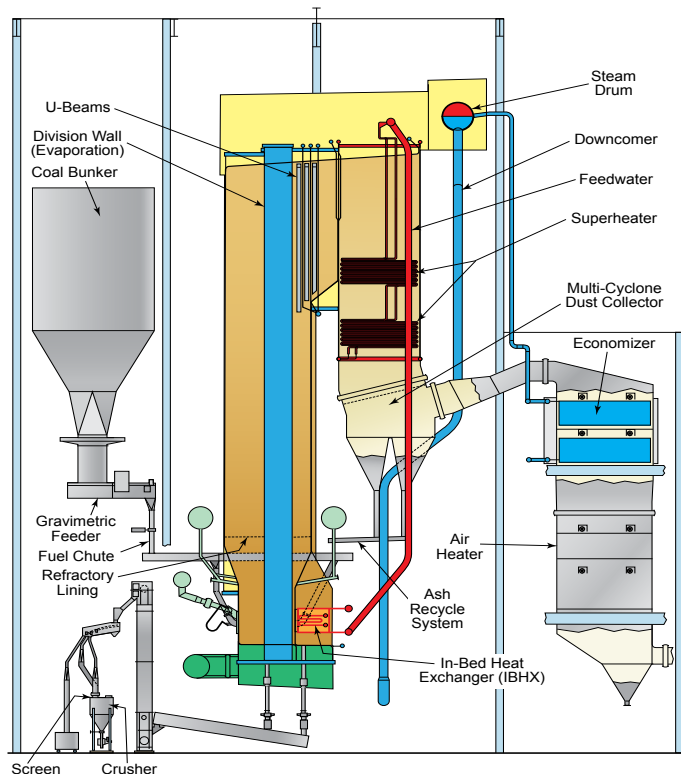
As required, usually to 1050F (566C)

Fuels

High sulfur and high ash fuels and various waste fuels (petroleum coke, waste coal, sludge and oil pitches), wood, biomass, gob, and culm



B&W IR-CFB Boiler



B&W IR-CFB Boiler with In-bed Heat Exchanger

Bubbling Fluidized-Bed Boiler

BFB

Design features

Top- or bottom-supported, one- or two-drum designs; proven attractive in new or retrofit applications and also provides an option to reduce SO₂ and NO_x emissions; open-bottom design for ease of large ash particle removal; burns wet wood-based fuels that other technologies can not combust [between approximately 2800 and 3500 Btu/lb HHV (6513 and 8141 kJ/kg) without support fuels]; reduces sludge volume while producing steam.

Capacity

Bottom-supported: Up to 225,000 lb/h (28.4 kg/s)

Top-supported: From 225,000 to 1,000,000 lb/h (28.4 to 126 kg/s)

Steam pressure

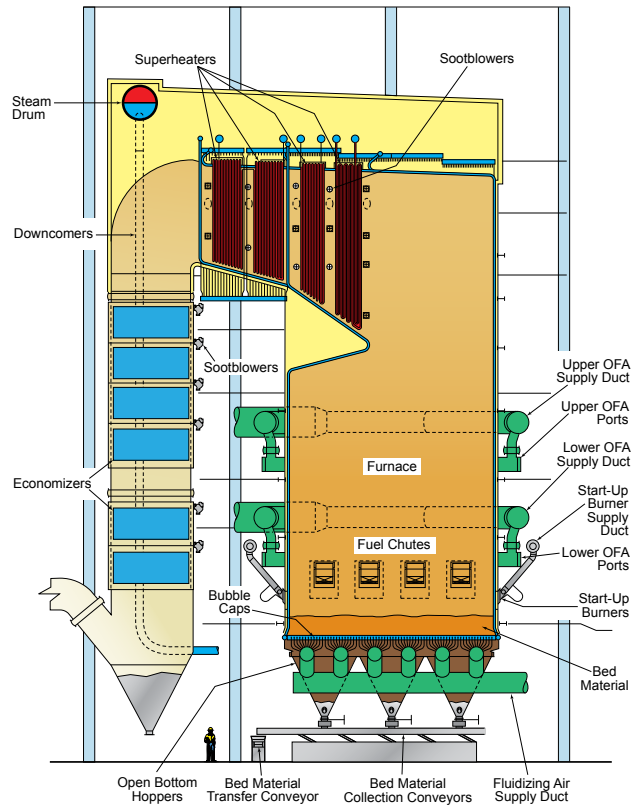
To 2600 psig (17.9 MPa)

Steam temperature

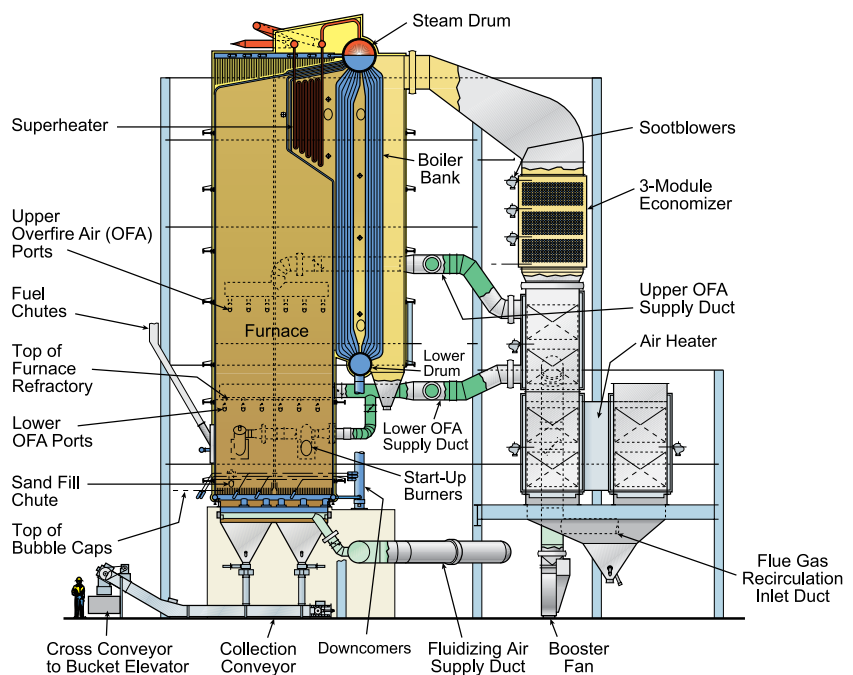
To 1000F (538C)

Fuels

Ideal for biomass and high moisture waste fuels such as sewage sludge, and the various sludges produced in pulp and paper mills and recycle paper plants, for both new boiler and retrofit projects; can burn wood wastes, bark, coal, tire derived fuel, oil, natural gas, and various coals



Top-Supported



Bottom-Supported

Towerpak® Boiler

Design features

Bottom-supported, one- or two-drum designs — a version of the Stirling® power boiler designed for lower capacities.

Capacity

20,000 to 300,000 lb/h
(2.5 to 37.8 kg/s)

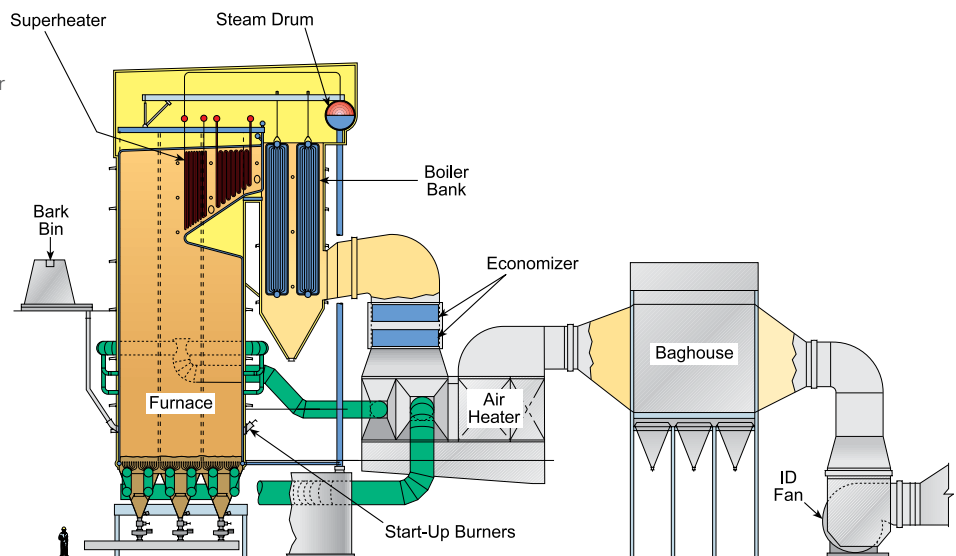
Steam pressure

One-Drum: To 2600 psig (17.9 MPa)

Two-Drum: To 1500 psig (10.3 MPa)

Steam temperature

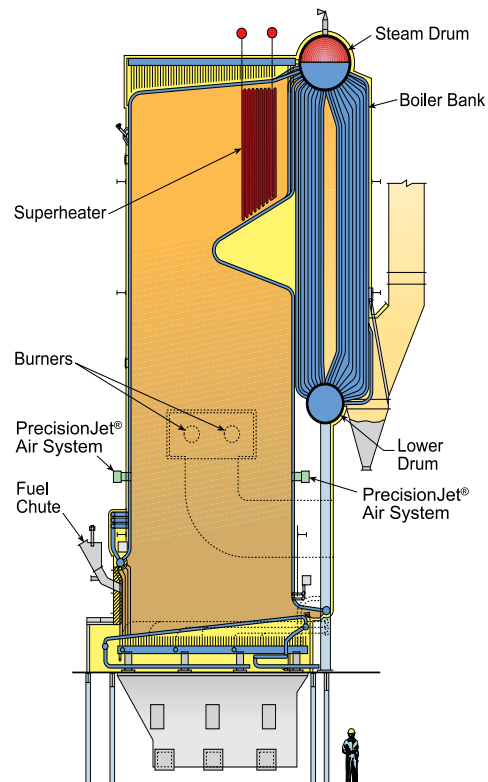
To 1000F (538C)



One-Drum

Fuels

Solid fuels such as wood, biomass and stoker coal, or oil and natural gas

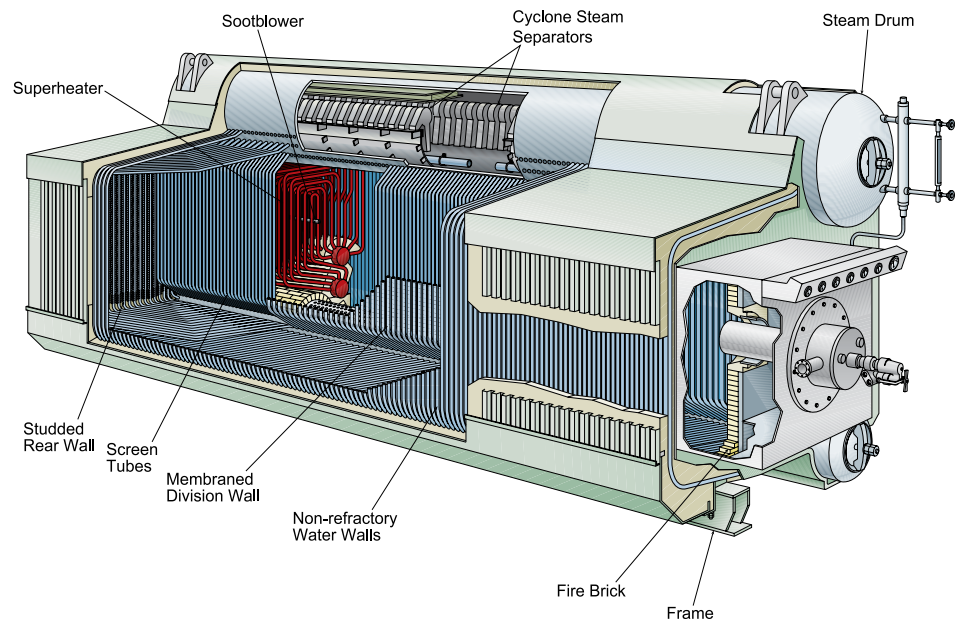


Two-Drum

Water-tube Package Boiler

Design features

FM (factory made) boilers are two-drum, bottom-supported units, which can be shipped by truck, rail, or barge; gas-tight furnace, uses membrane construction for pressure firing; drainable superheater; large diameter furnace tubes with minimized membrane width offers more direct heat transfer leading to a longer life; solid membrane design for furnace membrane panels (i.e., not fin-to-fin welded); offered in D- or O-type configurations.



Capacity

10,000 to 700,000 lb/h (4.5 to 320 t/h)

Steam pressure (design)

250 to 1800 psig (1.7 to 12.4 MPa)

Steam temperature

Saturated to 1005F (541C)

Fuels

Liquid and/or gaseous fuels, blast furnace gas (BFG), coke oven gas (COG), carbon monoxide (CO) gas, and various combustible byproduct gases and liquids

Note: for add-on design options for the industrial boiler line, see page 17.

Water-tube Industrial Boiler

Design features

PFx (partial factory construction) are economical options for larger industrial boiler applications; bottom-supported, single or multiple drums, natural circulation design with all-welded modular construction; fully drainable and flushable; forced or balanced draft operation; indoor or outdoor installation; standardized configurations to meet specific steam requirements.

Capacity

100,000 to 1,200,000 lb/h (45 to 544 t/h)

Steam pressure (design)

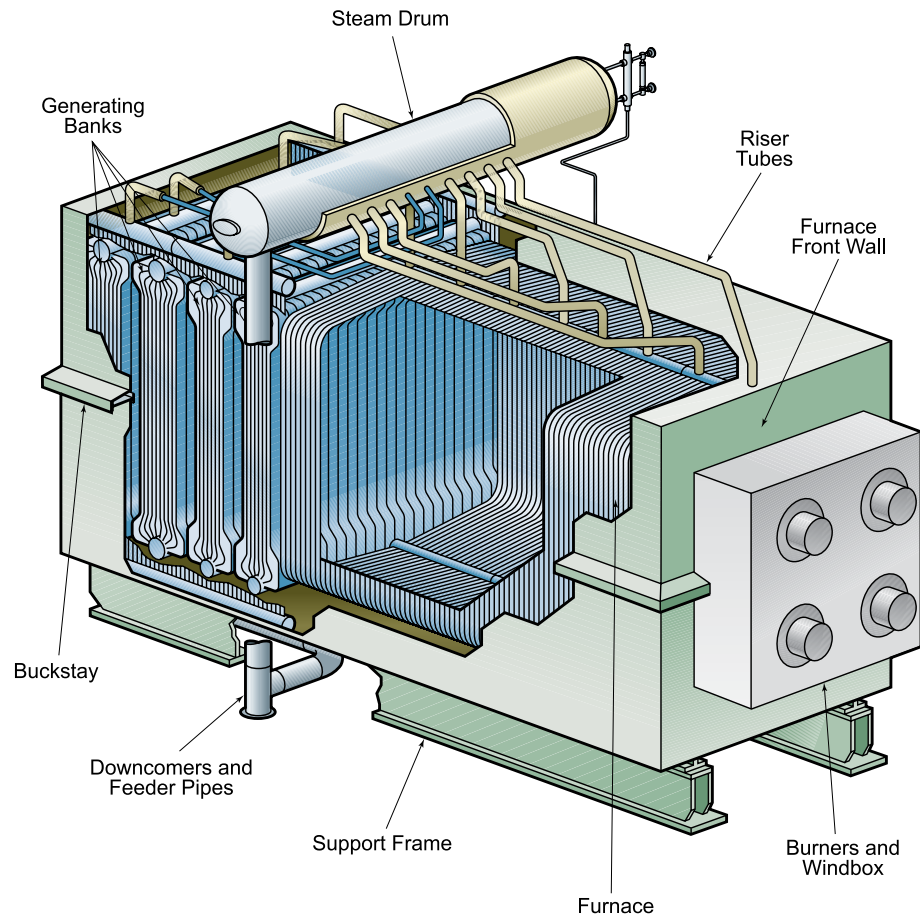
300 to 2400 psig (16.5 MPa)

Steam temperature

Saturated to 1005F (541C)

Fuels

Liquid and/or gaseous fuels, blast furnace gas (BFG), coke oven gas (COG), carbon monoxide (CO) gas, and various combustible byproduct gases and liquids

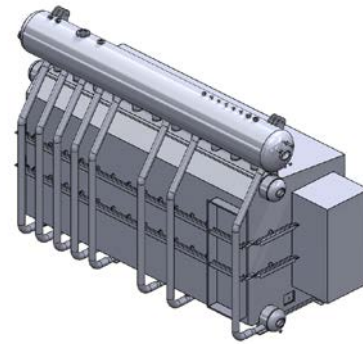


Note: for add-on design options for the industrial boiler line, see page 17.

Industrial Boiler Design Options

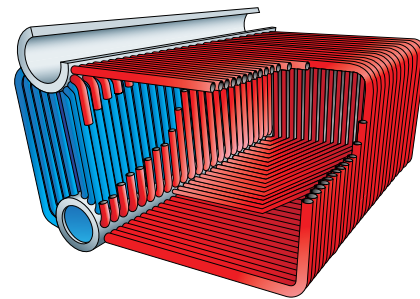
Elevated drum

The addition of an elevated drum is recommended for applications where the boiler size must be transported via heavy load hauler to an inland location, the process is such that a longer retention time is required, and/or wide operational load swings (>20% MCR per minute) are required.



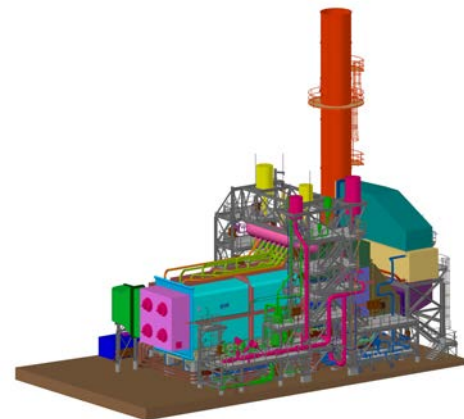
Multi-circulation

Multi-circulation technology is a B&W design feature that is recommended for applications where the water quality is less than the standards recommended by ASME. This technology separates the supplied boiler feedwater into two circuits: a “clean” water feed and a “dirty” water feed. The design routes the clean water to a clean section of the drum that is distributed to the hotter circuits in the boiler. The dirty water, which contains the bulk concentration of contaminants, is utilized in the colder circuit where plating out is less likely. The result is a high-quality steam requiring less blowdown, leading to longer operation with less shutdowns to contend with tube deposition.



Connection-ready

Connection-ready is a design feature where the boiler and auxiliary equipment are installed on large skid structures in either the boiler manufacturing facility or a nearby modularization yard. Additionally, all piping, wiring and insulation within B&W's boundary limit is shop-installed to the skid boundary where final connections are made in the field. This feature allows for quicker installation, start-up and commissioning of the steam system.



Auxiliary equipment

B&W can supply all equipment within the boundary limit of the boiler and associated systems that provide the most technically sound and cost-efficient operation. Typical equipment provided can include: forced draft and/or induced draft fans, low or ultra-low-NO_x burners, fuel trains, economizers, air quality control systems, stack, burner management system, combustion control system, performance optimization control systems, sootblowers, trim, instrumentation, deaerator, feed pumps, flues/ducts, piping, CEMS, platforms, and other ancillary equipment.

Process Recovery Boiler PR

Design features

A chemical and heat recovery boiler for the pulp and paper industry; concentrated black liquor and combustion air are introduced into the furnace where heat is recovered as steam for electricity generation and process heating, and the inorganic portion of the black liquor is recovered as sodium compounds.

Liquor processing capacity

To 10,000,000 lb/day
(4500 t/day) dry solids

Steam pressure

To 1850 psi (12.6 MPa) design

Steam temperature

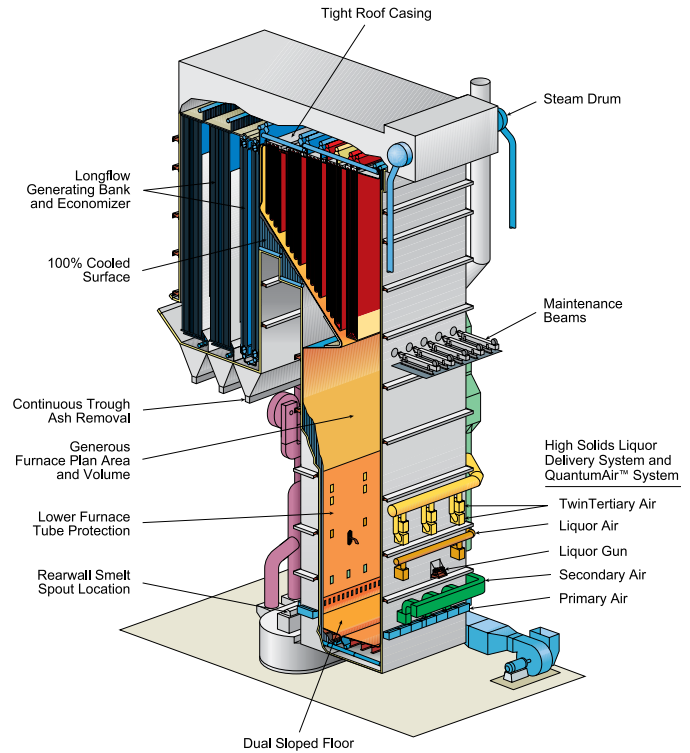
To 950F (510C)

Fuel

Pulp mill liquor

Auxiliary fuels

Natural gas and/or oil



Reheat Recovery Boiler

Design features

A chemical and heat recovery boiler for the pulp and paper industry with reheat and optional dual pressure configuration to improve lower furnace corrosion protection.

Steam pressure

To 2600 psi (17.9 MPa)

Steam temperature

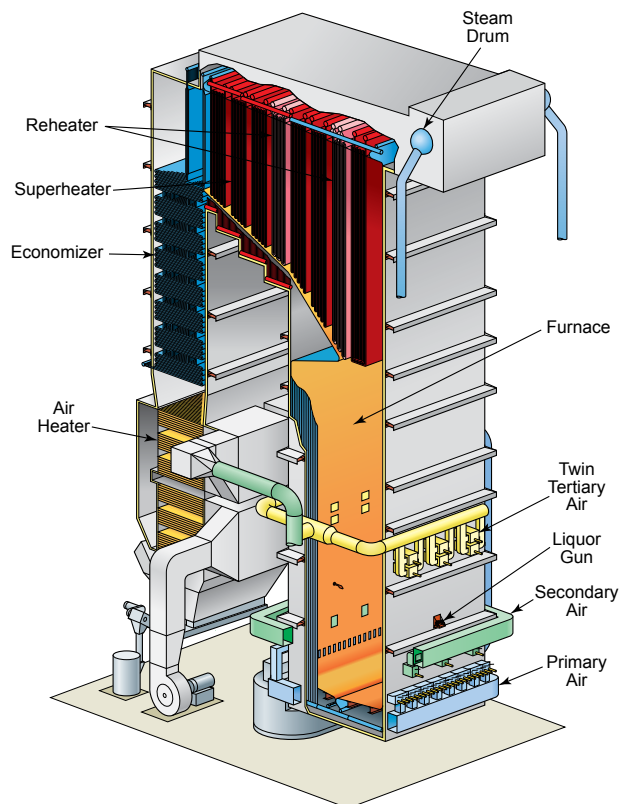
To 950F (510C)

Fuel

Pulp mill liquor

Auxiliary fuels

Natural gas and/or oil



Waste-To-Energy Boilers

RDF/MSW

Design features

A special top-supported Stirling® power boiler with one- or two-drum designs; membrane wall construction with lower furnace corrosion protection

Capacity

Up to 350,000 lb/h (44.1 kg/s) steam flow; 100 to 1000 t/day (91 to 910 tm/day) of refuse

Steam pressure

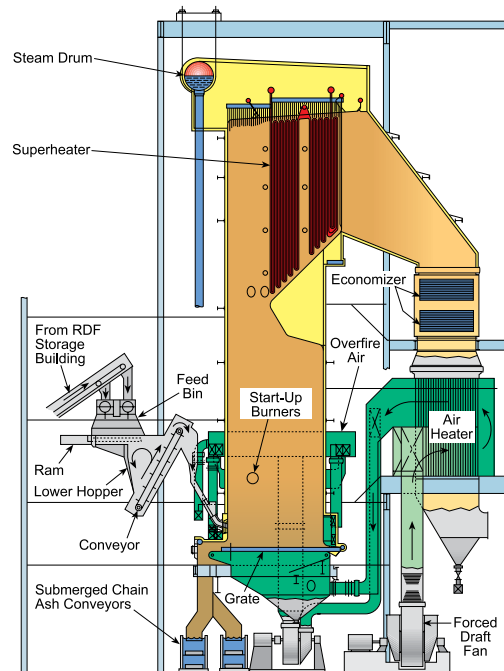
To 1800 psig (12.4 MPa) design

Steam temperature

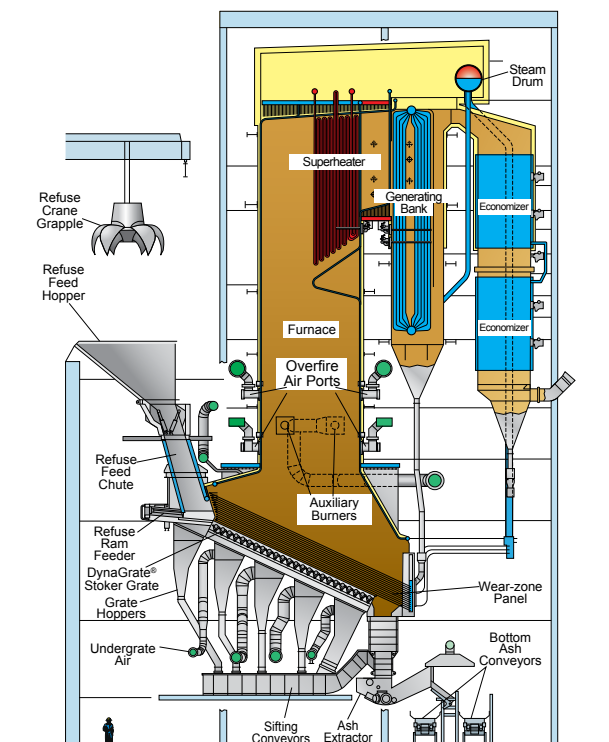
To 930F (499C)

Fuels

As-received, unprocessed municipal solid waste (MSW) and refuse-derived fuel (RDF) for new boilers; and RDF for retrofit applications; auxiliary gas and oil



Refuse-Derived Fuel (RDF) Boiler



Municipal Solid Waste (MSW) Boiler

Wet Flue Gas Desulfurization Scrubber

WET FGD

Design features

Spray tower scrubber used for SO₂ control, with a proven tray design for more uniform flue gas distribution and improved absorption.

Applicable boiler sizes

50 MW to 1300 MW

Removal efficiencies

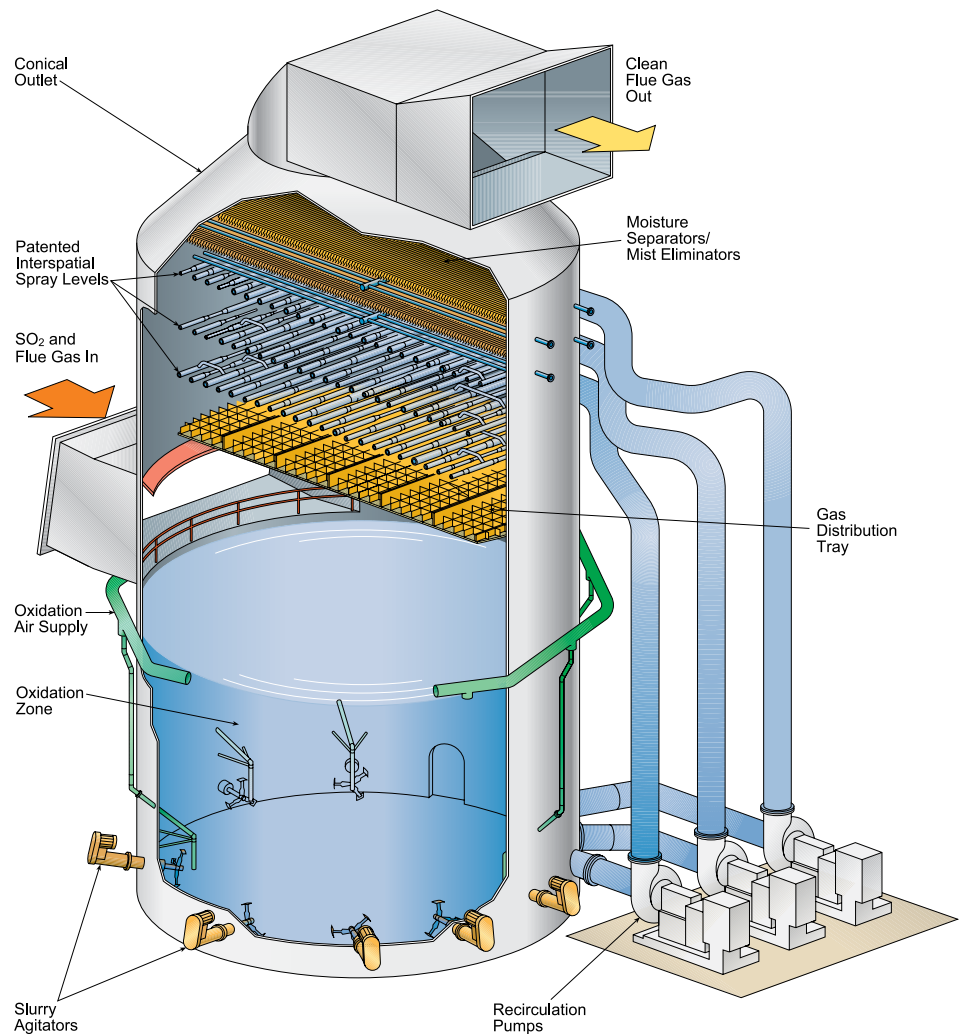
To 99%

Reagents

Primarily limestone; also lime, magnesium-enhanced lime, sodium carbonate and ammonia

Fuels

All solid fuels — primarily coal



Spray Dryer Absorber SDA

Design features

A rotary atomizer delivers a slurry of an alkaline reagent into the hot flue gas to absorb the SO₂ and other acid gases; a close-coupled particulate control device, typically a fabric filter, is used to collect the unreacted reagent, flyash and reaction products; an optional recycle system returns unused reagent to the rotary atomizer to increase the SDA performance.

Applicable boiler sizes

To 400 MW for a single module; applications up to 900 MW with parallel modules

SO₂ removal efficiencies

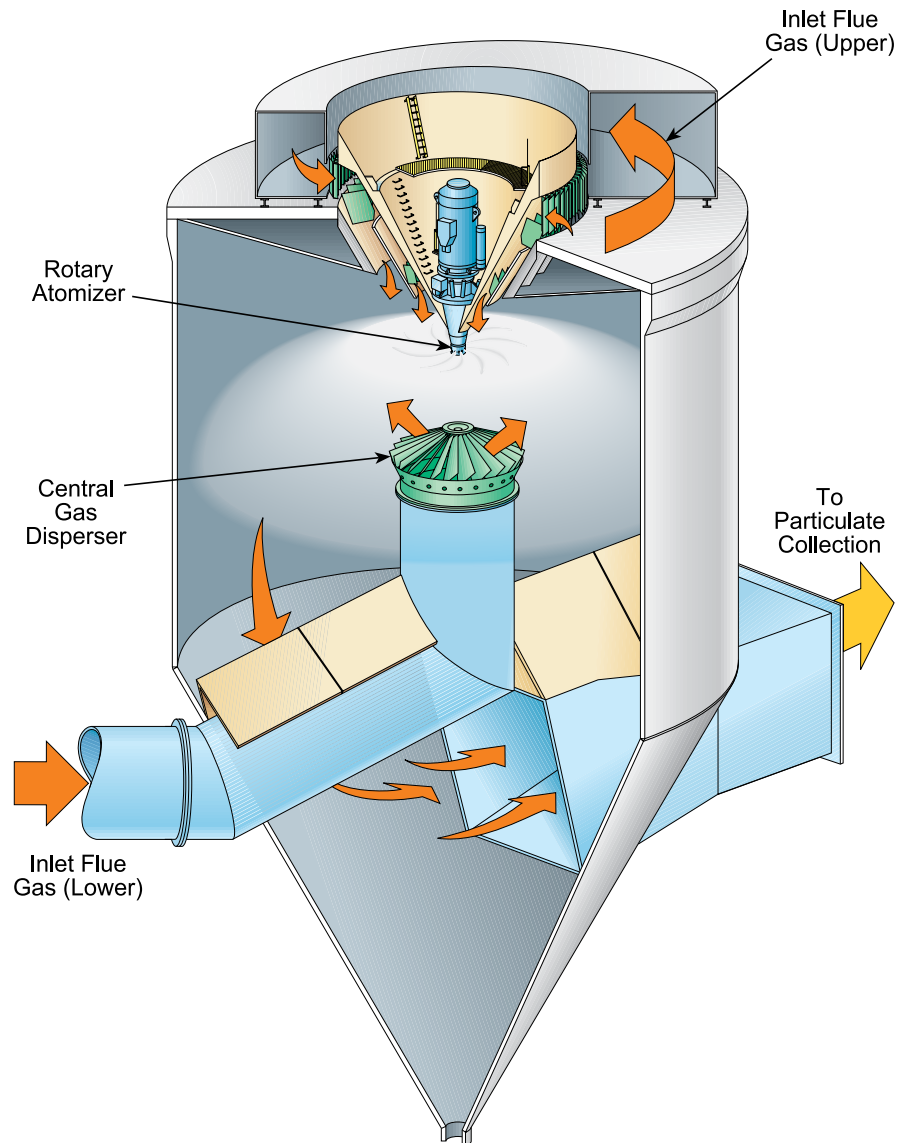
To 97%

Reagents

Lime slurry and optional recycle system

Fuels

All solid fuels, including coal, biomass and municipal solid waste, as well as fuel oil



Circulating Dry Scrubber CDS

Design features

Within a cylindrical tower, water is atomized into a vertical circulating bed of dry alkaline reagent to absorb SO_2 and other acid gases; a close-coupled particulate control device, typically a fabric filter, is used to collect the unreacted reagent, flyash and reaction products; most solids collected in the fabric filter are recycled to the absorber to create a high solids circulating load in the absorber.

Applicable boiler sizes

Applications up to 400 MW with a single module

Removal efficiencies

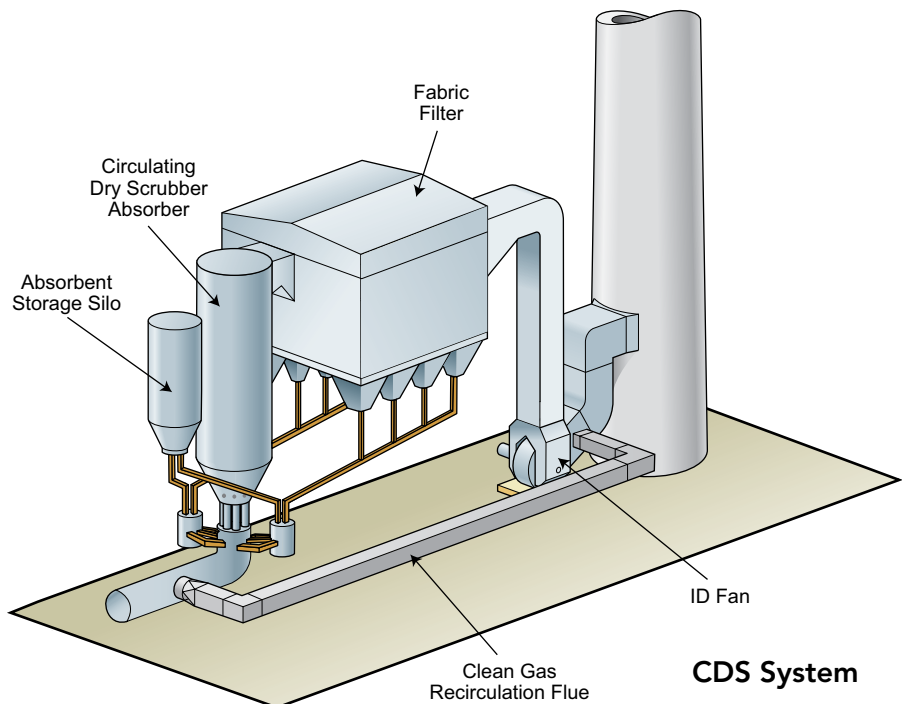
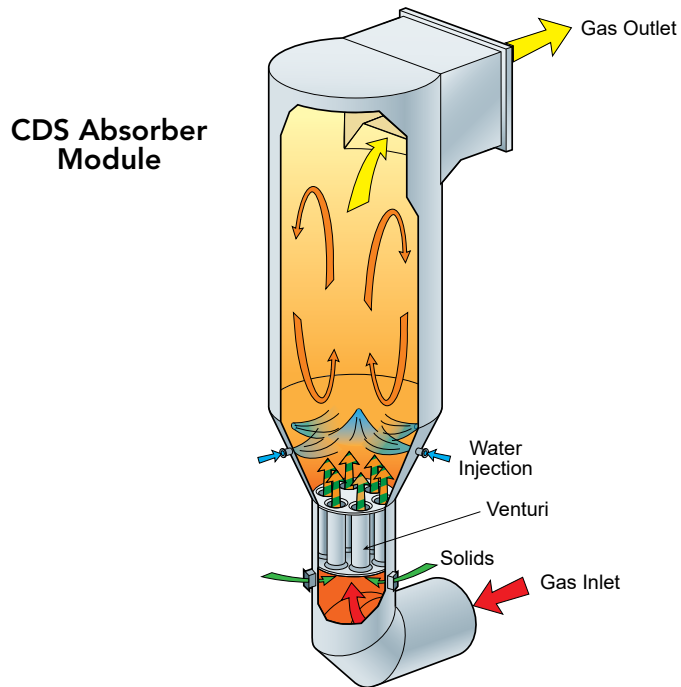
To 98%

Reagents

Hydrated lime and recycled byproduct

Fuels

All solid fuels, including coal, biomass and municipal solid waste, as well as fuel oil



Dry Sorbent Injection DSI

Design features

A dry alkaline sorbent is injected into the flue gas stream for acid gas absorption; reaction products, excess sorbent and flyash are collected in a downstream particulate control device; most commonly used for control of SO₂ and SO₃ but may be used for control of other acid gases including HCl and HF.

Applications and removal efficiencies

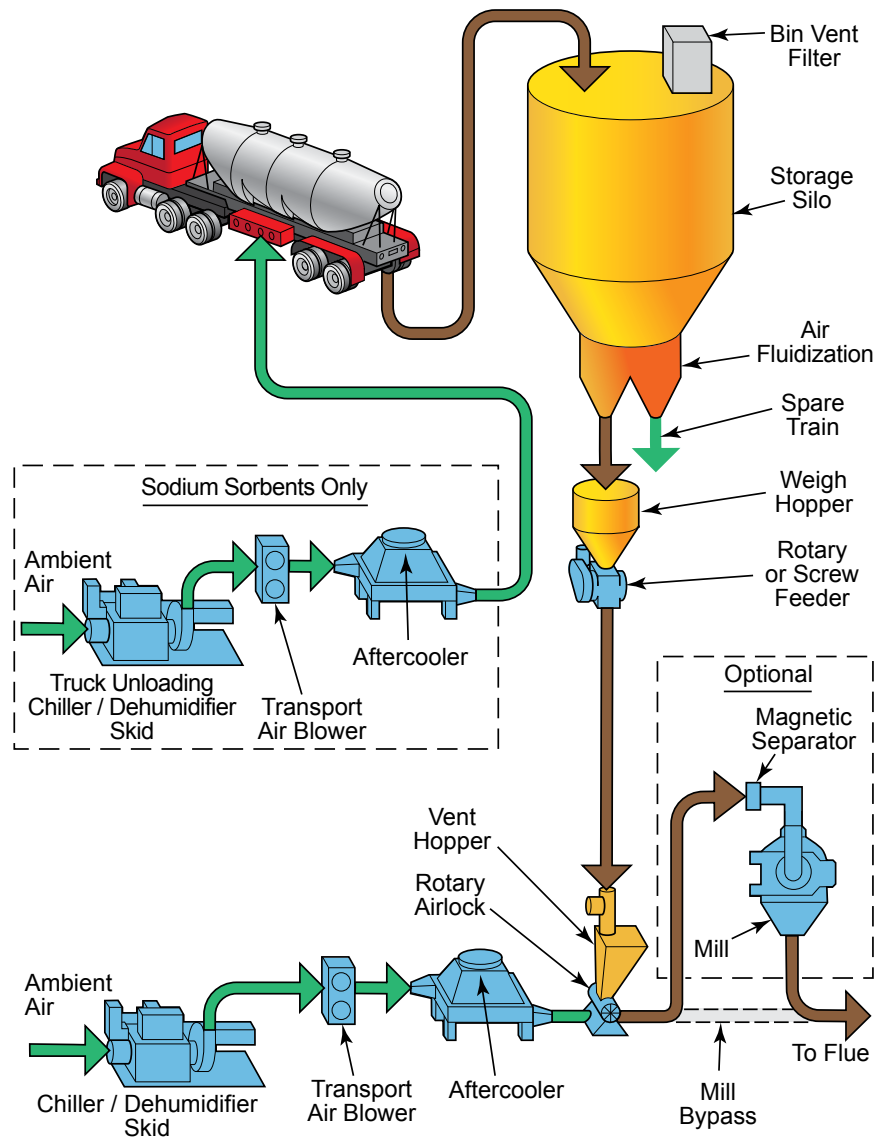
DSI is well suited for moderate SO₂ reduction in utility or industrial boilers firing low sulfur fuels; also used for reduction of SO₃ upstream of activated carbon injection systems to minimize activated carbon deactivation and for control of visible emissions; removal of other acid gases can approach 98%.

Reagents

Hydrated lime is typically used for SO₃ control while trona and sodium bicarbonate may be used for all acid gases.

Fuels

All solid fuels, including coal, biomass and municipal solid waste



Mercury Control

Design features

Activated carbon injection: Powdered activated carbon (PAC) is injected into the flue gas stream; mercury is adsorbed onto the surface of the PAC and is removed in a downstream particulate control device.

Calcium chloride injection: for coals with low chlorine levels; an aqueous solution of calcium chloride is delivered onto the coal fuel feed which promotes the oxidation of elemental mercury in the flue gas, improving capture with downstream controls.

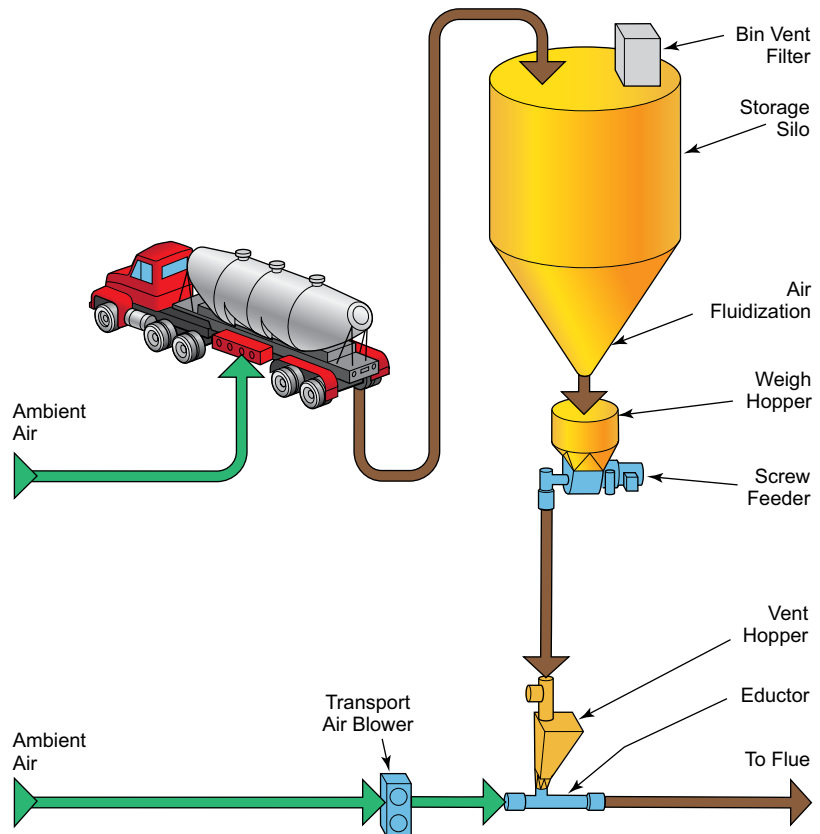
Absorption Plus (Hg)TM sulfide injection: augments mercury control in wet FGD systems by precipitating oxidized mercury from the scrubber liquid, increasing removal with the solids; improves overall mercury capture and inhibits mercury re-emission.

Removal efficiencies

Varies with technology, installed equipment, mercury present in fuel, and gas-phase form of mercury (elemental or oxidized)

Fuels

All mercury-containing solid and liquid fuels



Pulse Jet Fabric Filter PJFF

Design features

Multiple compartment enclosure with each compartment containing up to several thousand long, vertically supported, small diameter fabric bags; the gas passes through the porous bag material which separates the particulate from the flue gas; bags are cleaned by a pulse of compressed air.

Applicable boiler sizes

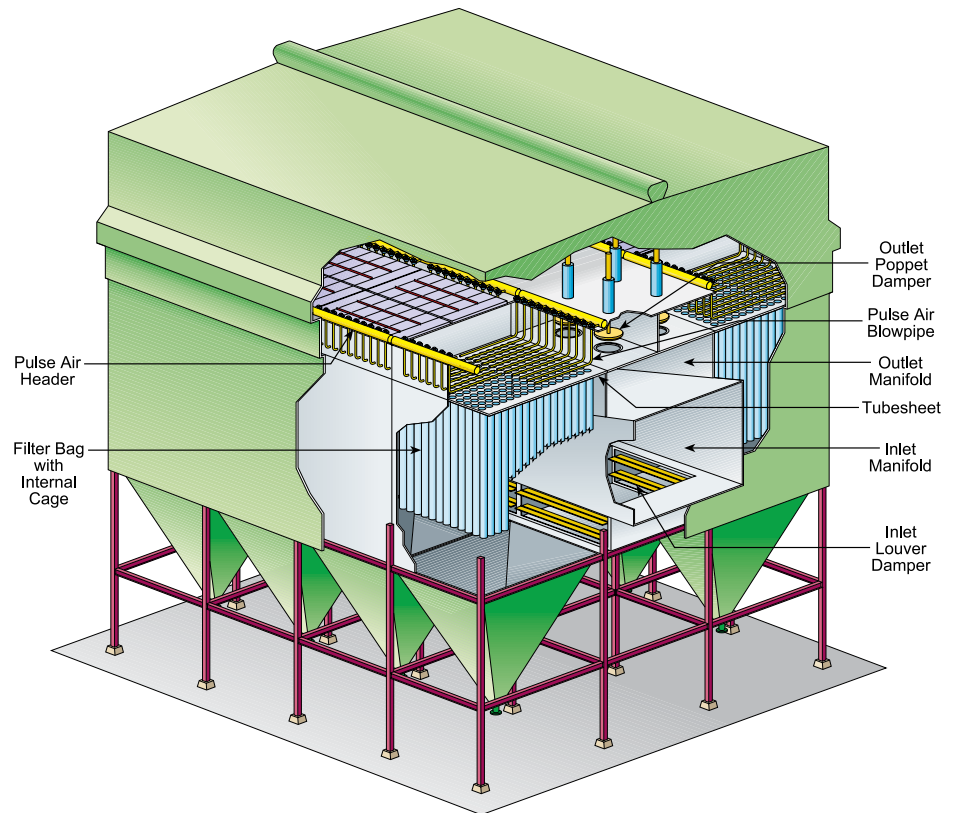
25 MW to 1300 MW

Removal efficiencies

To 99.9+%

Fuels

Coal and municipal solid waste



Horizontal Wet Electrostatic Precipitator

WET ESP

Design features

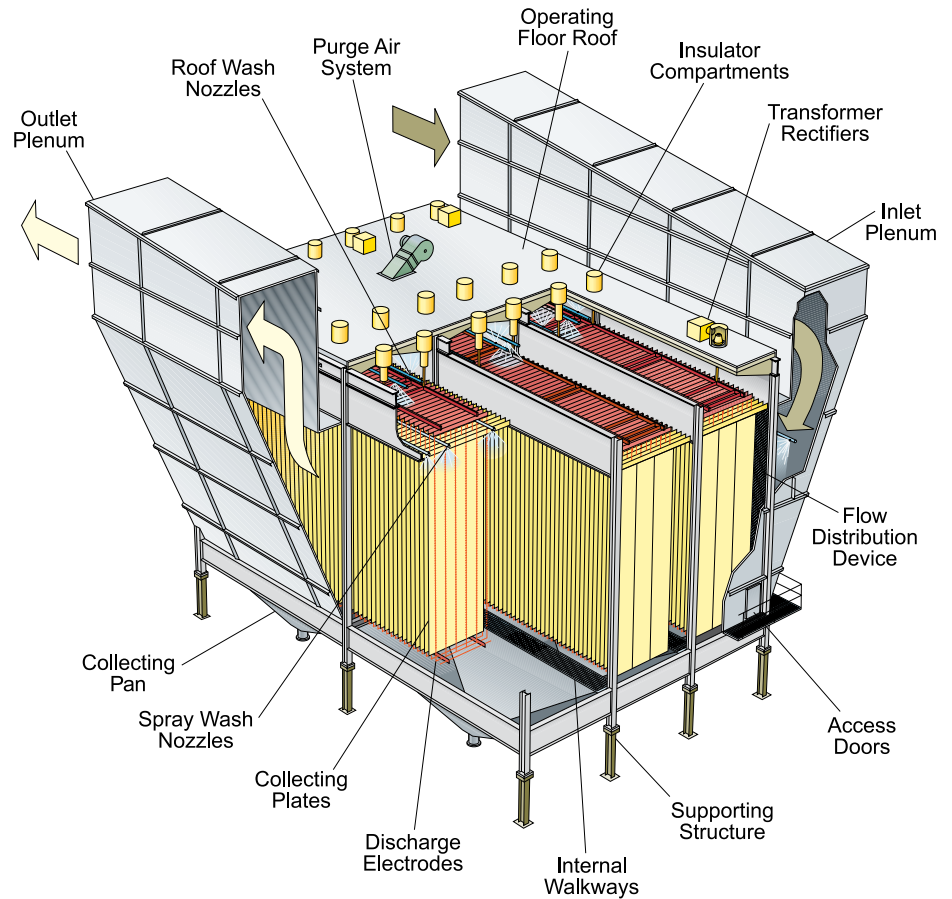
Polishing device captures acid mist and fine particulates. In addition to reducing particulate emissions less than 2.5 microns, this equipment controls total particulate emissions to required values. Well suited for new boiler installations as well as retrofit applications in existing plants. Uses continuous washing feature for cleaning and pH modification to allow use of lesser grade alloy steel, thus reducing overall cost.

Applicable boiler sizes

Units above 100 MW

Fuels

All sulfur-bearing fuels



Dry Electrostatic Precipitator

DRY ESP

Design features

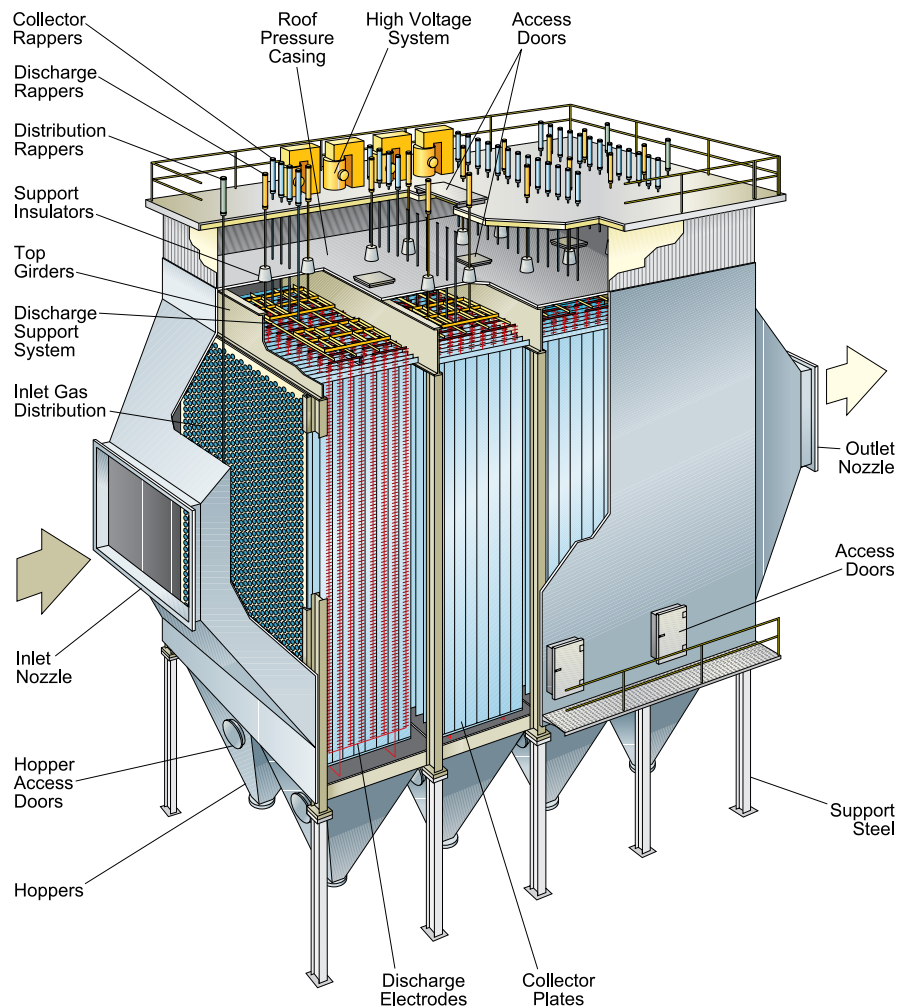
Electrically charges ash particles in the flue gas and collects the particles on collector plates before being mechanically removed through the ash hoppers — comprised of a series of parallel vertical collector plates through which the flue gas passes horizontally; charging electrodes are centered between the plates, providing an electric field to charge the particles and attract them to the grounded collecting plates.

Applicable boiler sizes

25 MW to 1300 MW

Fuels

All fuels



Selective Catalytic Reduction SCR

Design features

Reduces flue gas NO_x to N₂ and H₂O using ammonia in contact with an active catalyst surface to produce a chemical reaction — most effective method of reducing NO_x emissions especially where high reduction efficiencies (70 to 90%) are required; integrates into multi-pollutant control with mercury oxidation across catalyst.

Capacity

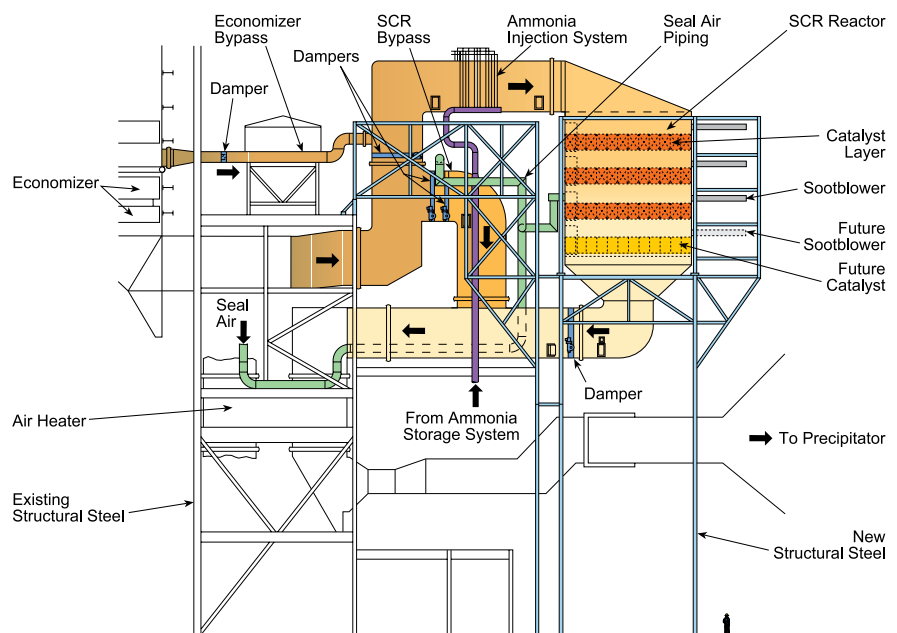
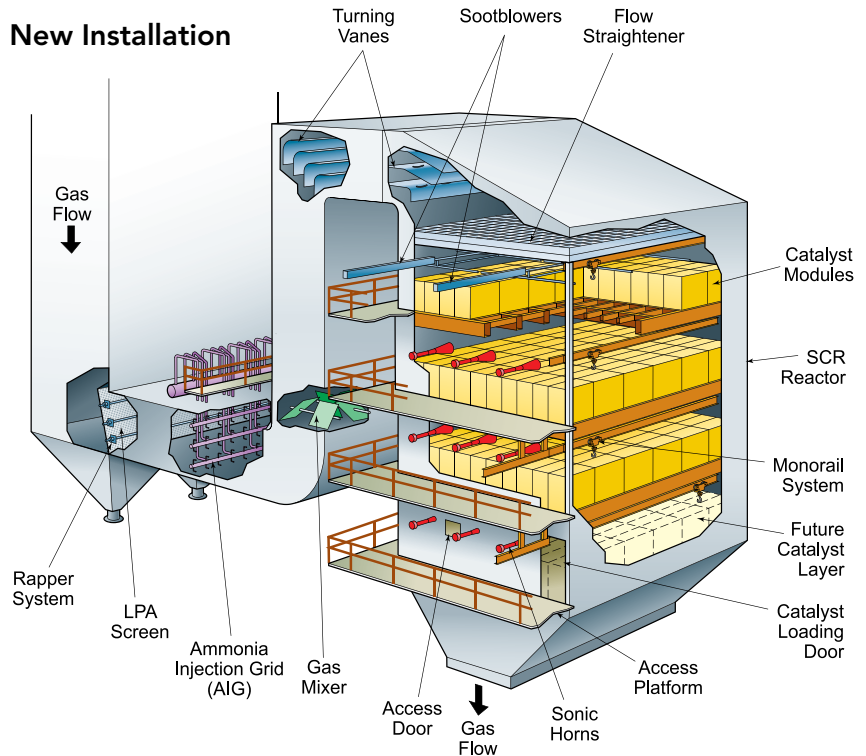
Designed and sized to meet project requirements

Temperature range

Coal firing: from 575 to 840F (302 to 449C)
 Natural gas: from 450 to 800F (232 to 427C)
 Optimum performance occurs between 700 to 750F (371 and 399C)

Fuels

Coal, natural gas, oil, wood, MSW, biomass and others



B&W Roll Wheel™ Pulverizer

Type

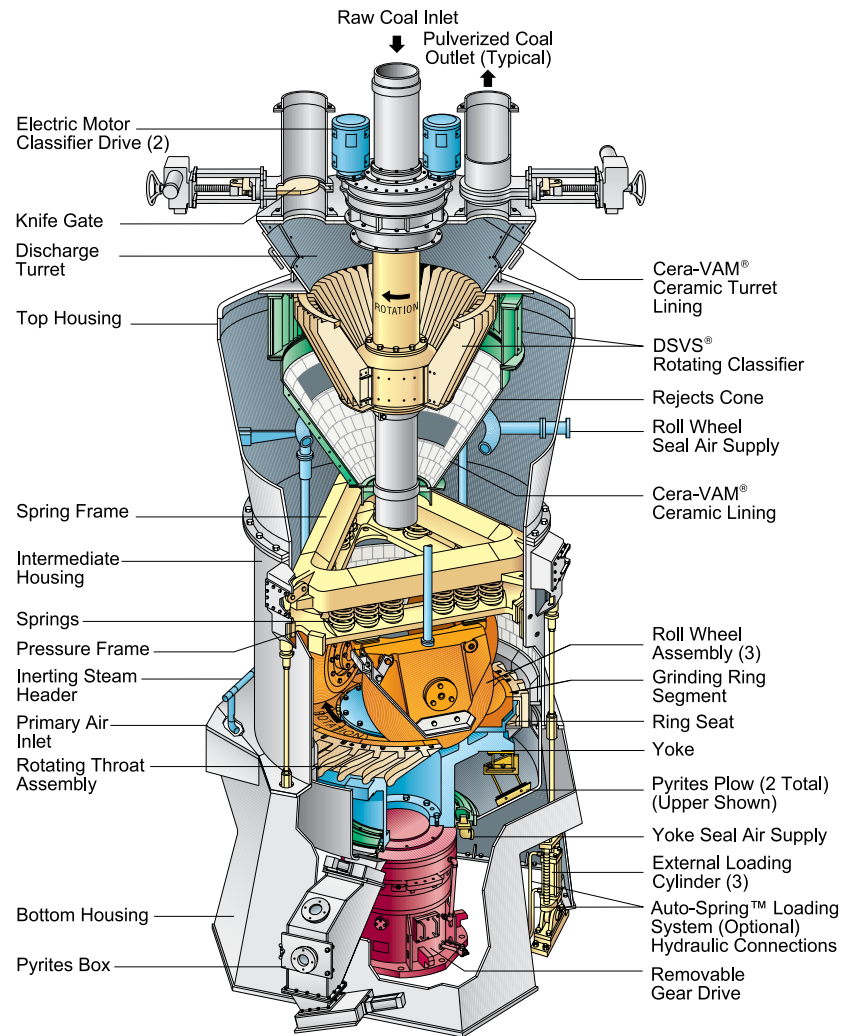
Vertical, air-swept roll-and-race

Design features

Loading system allows independent radial movement of each roller; maintains design performance with up to 40% weight loss of roll wheel tires; stationary or variable speed rotating dual stage classifiers; non-integral gear drive.

Capacity

17 to 115 t/h (15 to 104 t_m/h)



EL Pulverizer

Type

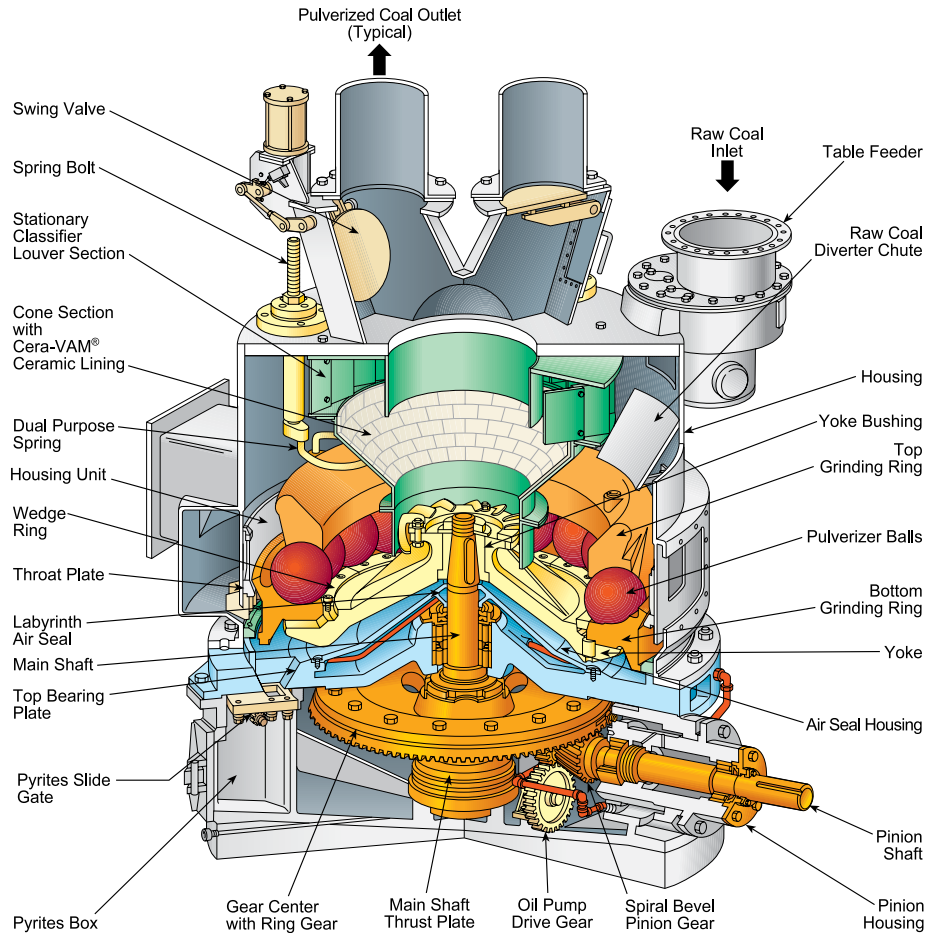
Vertical, air-swept ball-and-ring, or ball-and-race

Design features

Compact design; maintains performance with up to 80% weight loss of balls; stationary or variable speed rotating dual stage classifiers

Capacity

Up to 23 t/h (21 t_m/h)



Airejet® Low NO_x Coal Burner

Type

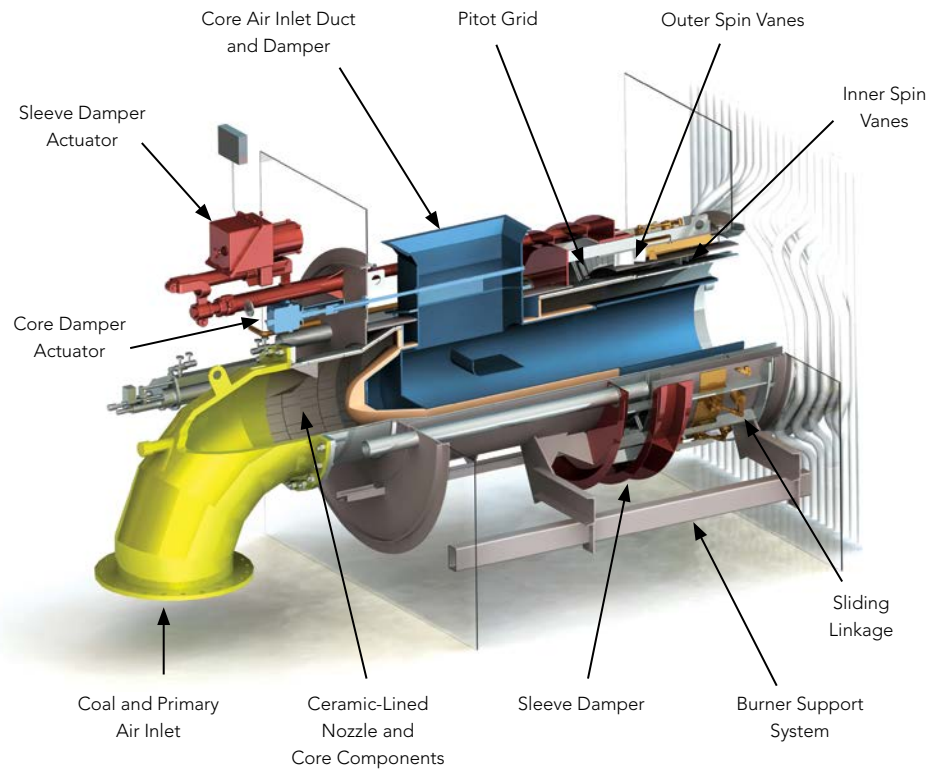
Unique low NO_x coal burner with center air jet for use with overfire air (OFA) systems

Design features

Developed exclusively for use with OFA systems for the lowest NO_x emissions. Designed to accelerate coal ignition and intensify combustion for very rapid achievement of fuel rich conditions in the burner zone — the key to minimizing NO_x emissions. Secondary air is drawn from the windbox to produce an axial air jet, which is surrounded by the coal stream. The coal stream is, in turn, surrounded by two air zones. This “inside-out / outside-in” ignition and combustion of the coal produces a very stable, intense flame. Ceramic materials provide long wear life for the core pipe and coal nozzle. A one-piece, shop-assembled burner facilitates quality and simplifies installation. In retrofit applications, generally plugs into existing wall openings.

NO_x removal efficiencies

Compared to other advanced low NO_x burners in use with OFA, the AireJet burner further reduces NO_x by up to 30% with lower excess air for improved boiler efficiency.



DRB-4Z® Low NO_x Coal Burner

Type

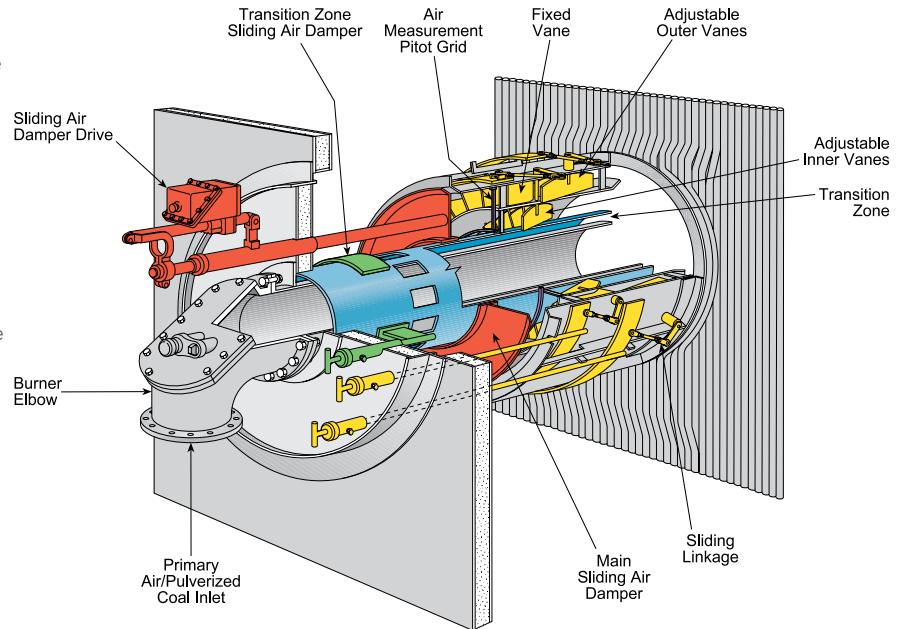
Multi-air zone coal burner with transition zone

Design features

Combines primary zone combustion control with fuel and air staging technology to achieve very low NO_x emissions along with improved combustion efficiency; shop-assembled, one-piece assembly simplifies installation; well suited for use with an overfire air system; in most applications, plugs into wall openings to facilitate its use as a replacement upgrade; burner also can be equipped to fire natural gas or fuel oil

NO_x removal efficiencies

Reductions up to 80% from uncontrolled levels in combination with overfire air



XCL-S® Low NO_x Oil And Gas Burner

Type

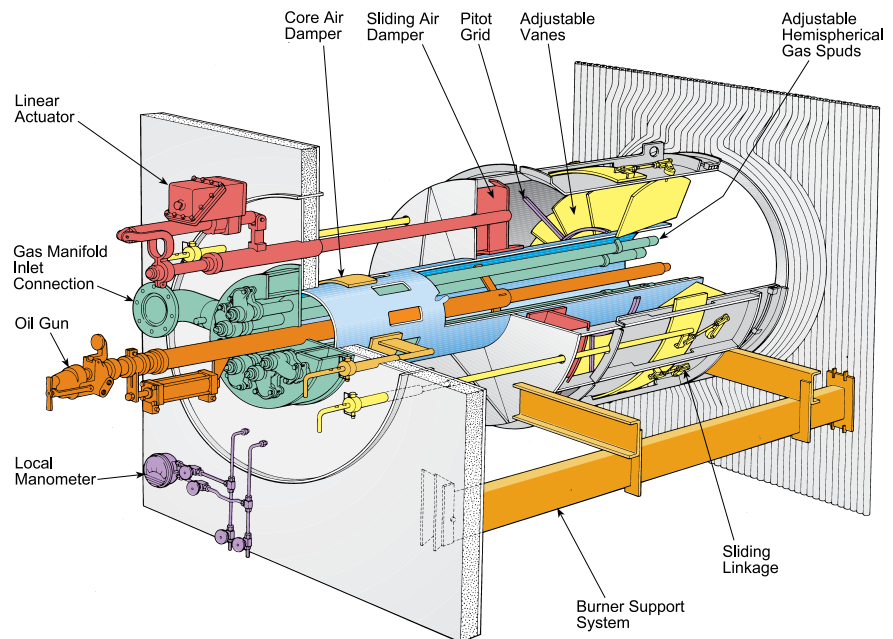
Double air zone oil and gas burner for low NO_x applications

Design features

Shop-assembled, one-piece assembly simplifies installation; well suited for use with an overfire air system; ideally suited as an upgrade to existing circular or other wall-fired type burners

NO_x removal efficiencies

Reductions exceeding 80% from uncontrolled levels in combination with overfire air and flue gas recirculation systems



Dual Zone NO_x Port (Overfire Air System)

Type

An air staging system utilizing ports with two air zones to optimize emission reductions

Function

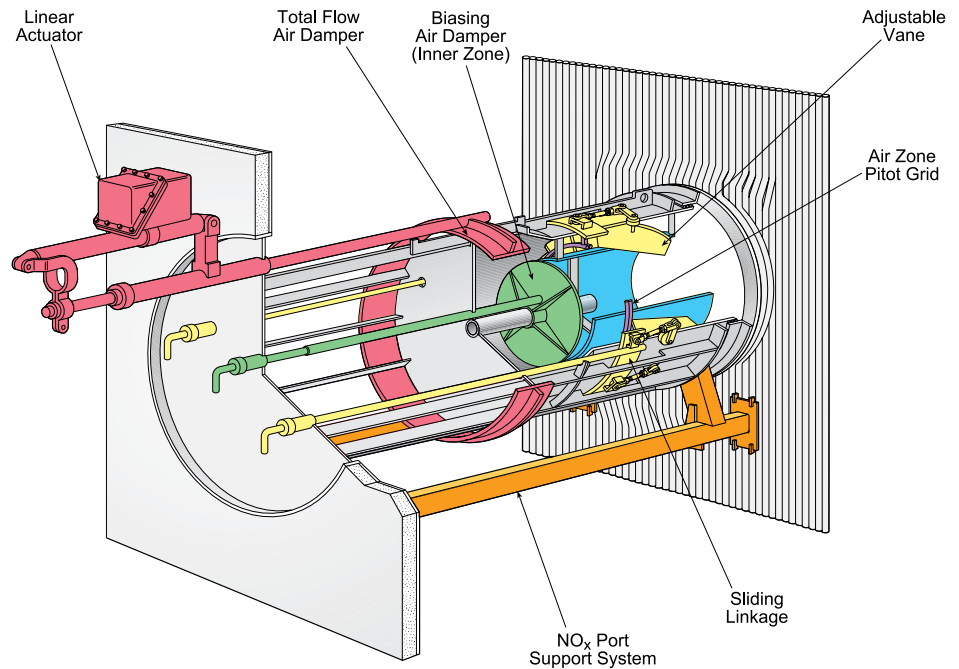
Diverts a portion of combustion air that otherwise would be supplied to the burners to another location downstream in the combustion process; cutting the amount of air supplied to the burners causes a fuel rich/oxygen lean zone to develop; NO_x is suppressed and reduced as it passes through the fuel rich zone. The overfire air system completes the combustion process.

Design features

Dual zone ports simultaneously provide air across the furnace to mix with combustibles well away from the walls, while also supplying air to mix with combustibles in the proximity of the ports; heavy-duty design is well suited for extreme conditions of utility boilers; on-line adjustability provides means to fine tune mixing and minimize NO_x emissions.

NO_x removal efficiencies

Dependant on burner design, arrangement and firing conditions, and the fuel being fired



Wall-Fired Oil And Gas Igniters

Type

Single or multi-burner wall-fired.

Design features

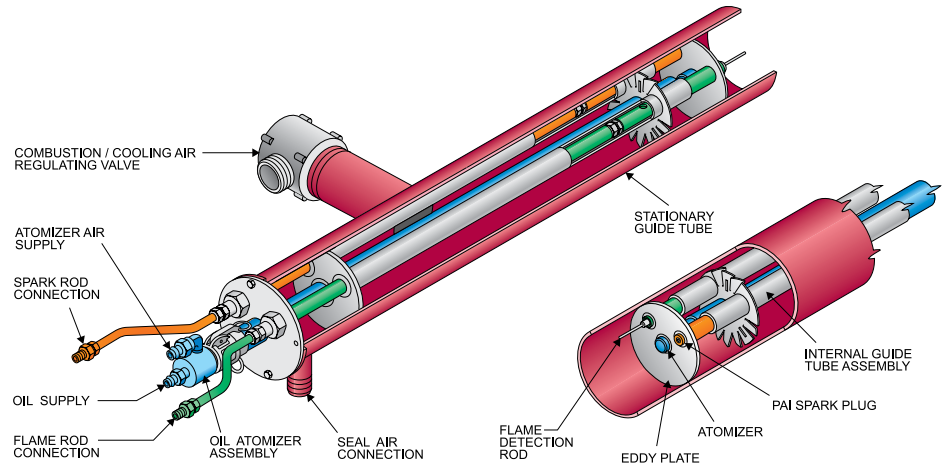
FPS™ wall-fired oil and gas igniters are fixed position, low maintenance plug-in designs. The stationary design eliminates pneumatic cylinders and moving parts that can seize during the startup cycle and require maintenance. Variable heat input capabilities allow igniter operation at maximum heat input for boiler warm-up and at an economically reduced heat input for main fuel light-off and ignition support. Igniter flame detection is achieved using an integral flame rod that measures the ionization of gases from the combustion process.

Capacity

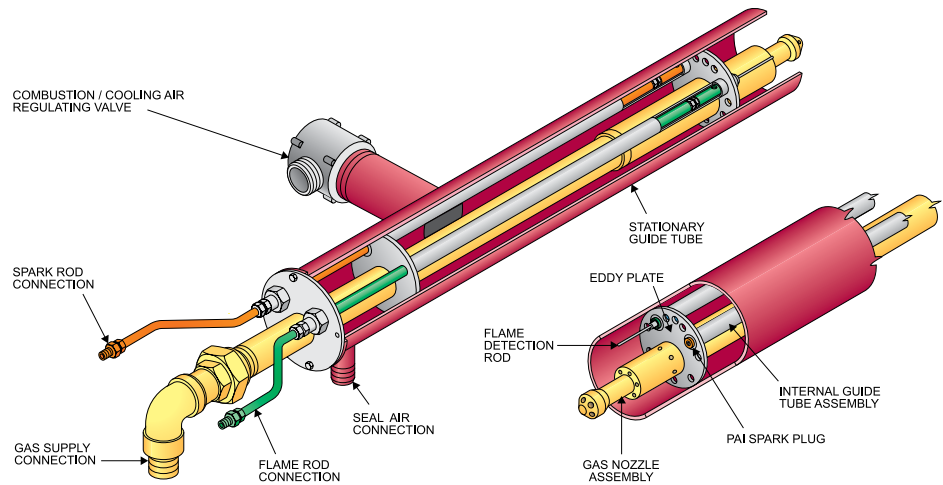
No. 2 Fuel Oil: 4 to 35 MBtu/h.
 Natural Gas: 1 to 35 MBtu/h.

Related products

- Dual fuel igniter
- Propane igniter
- Retractable igniter



Oil Igniter



Gas Igniter

Horn Oil And Gas Igniters

Type

Horn igniters for corner-fired applications

Design features

The FPS™ oil and gas horn igniters integrate electrical and mechanical components to fit standard windbox arrangements. Differential pressure between the igniter combustion air source and the furnace propels the turbulent fan-shaped igniter flame out of the horn to penetrate the burner fuel stream and ensure positive light-off of the main fuel. Each igniter assembly is supplied with an integral flame detection system and can be furnished with or without a single pour stainless steel horn. The oil horn igniter is equipped with a low voltage, self cleaning plasma arc ignition system; the gas horn igniter utilizes a high voltage, spark plug type system.

Capacity

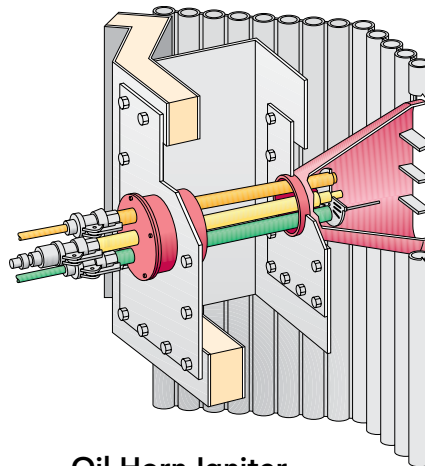
No. 2 Fuel Oil: 1 to 6 MBtu/h. No. 2 Fuel Oil with booster package: 1 to 20 MBtu/h. Natural Gas: 1 to 20 MBtu/h.

Related products

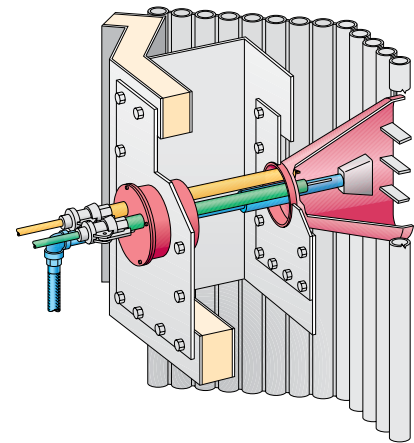
Dual fuel igniter

Auxiliary oil gun

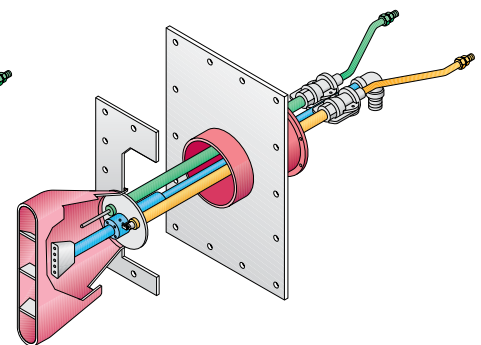
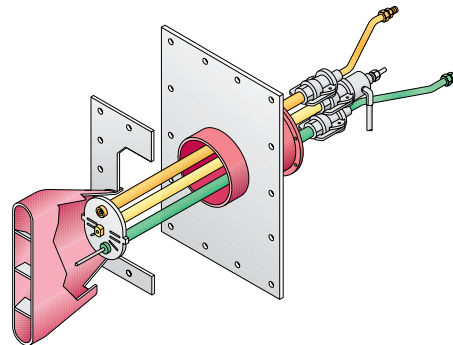
Horn igniter upgrade products



Oil Horn Igniter



Gas Horn Igniter



Cyclone Furnace

Design features

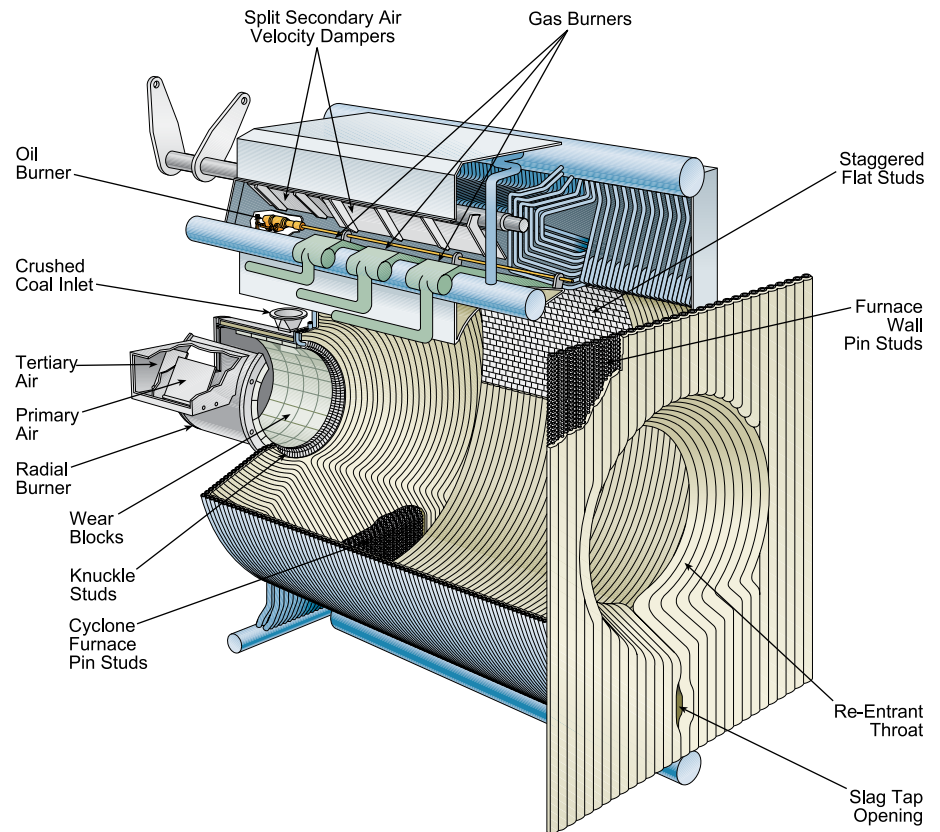
Commercially built in sizes from 6 to 10 ft (1.8 to 3 m) in diameter; water-cooled tangent tube, seal welded construction; three general boiler arrangements — single wall firing with screen tubes, open furnace single wall firing with close-coupled target wall, and open furnace opposed wall firing. Various burner types are available. Cyclone-equipped units include Universal Pressure (UP), Radiant Boilers (RB), and Stirling boilers.

Standard maximum heat input range

150 to 425+ MBtu/h
(44 to 125+ MWt)

Fuel

Bituminous, subbituminous and lignite coal grades suitable for cyclone operation, fuel oil and natural gas; co-firing experience includes utilizing tire derived fuel (TDF), refuse derived fuel (RDF), paper mill sludge, wood, petroleum coke, and coke oven gas



Diamond Power® Boiler Cleaning Equipment

Design features

Air, steam or water cleaning for boiler furnace walls, convection pass surfaces, economizers, SCRs and air heaters; models featuring retractable lance tubes and Gemini® nozzles dramatically enhance cleaning performance while reducing operations, maintenance costs, and steam consumption.

Products available

Steam/air sootblowers

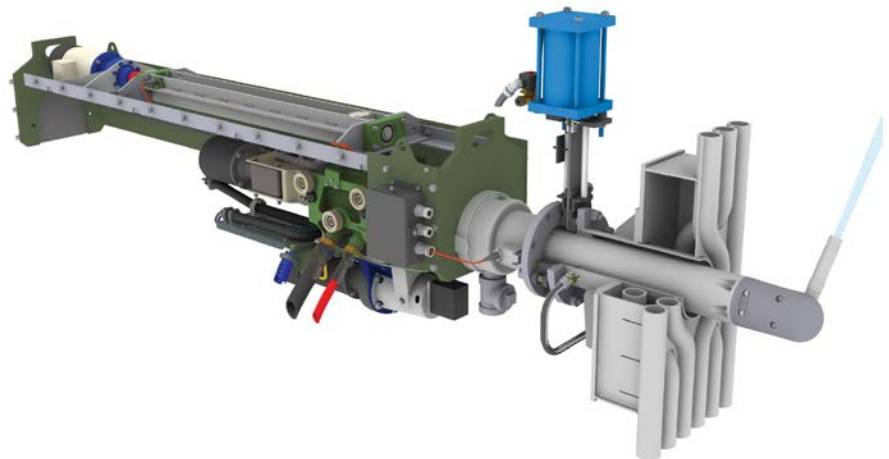
Water cleaning

Dual media cleaners

Intelligent cleaning and controls

Recovery boiler port rodders, liquor gun stations and cleaners

Cameras and diagnostics



HydroJet® Retractable Sootblower



IK-700® Retractable Sootblower



IR-3Z™ Furnace Wall Sootblower

Allen-Sherman-Hoff® Ash Handling Systems

Design features

Systems available for bottom ash, pulverizer rejects, economizer ash, flyash and scrubber byproducts; proven ash pond alternatives for coal combustion residuals

Products available

Submerged chain conveyors

Submerged grind conveyors

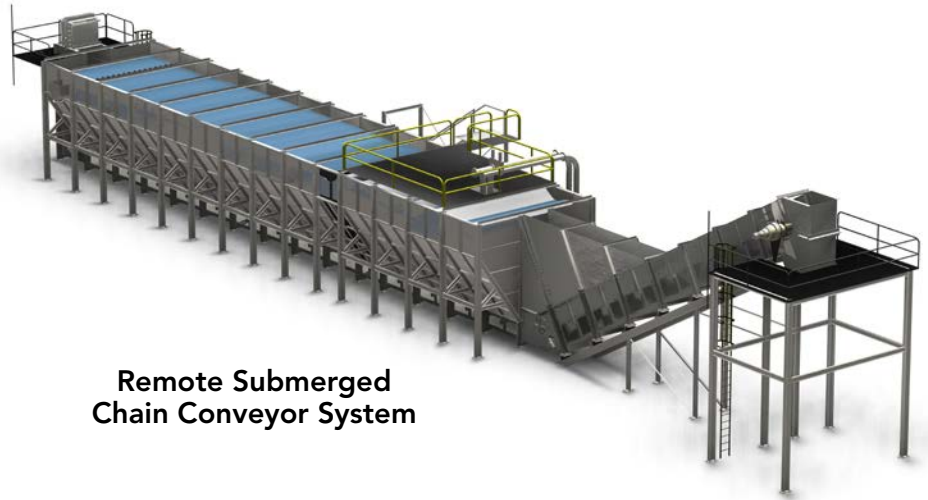
Remote submerged chain conveyors

Hydrobin® dewatering bin

Dry bottom ash systems

Pneumatic and dense phase flyash conveying systems

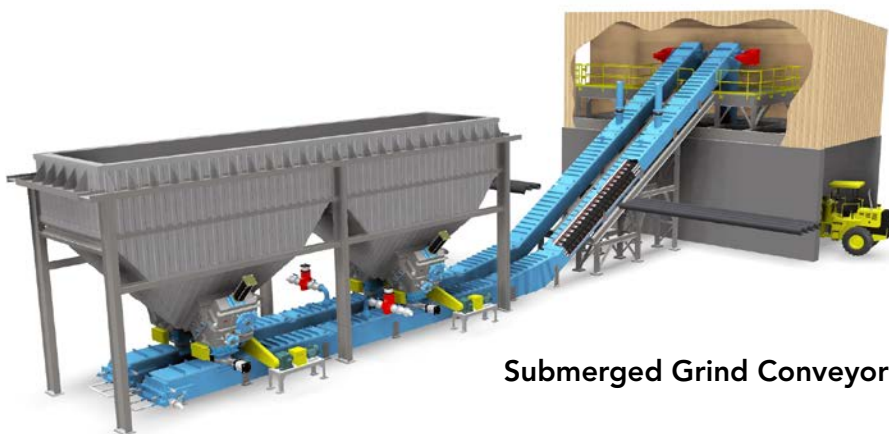
Mechanical conveyors



Remote Submerged Chain Conveyor System



Hydrobin Dewatering System

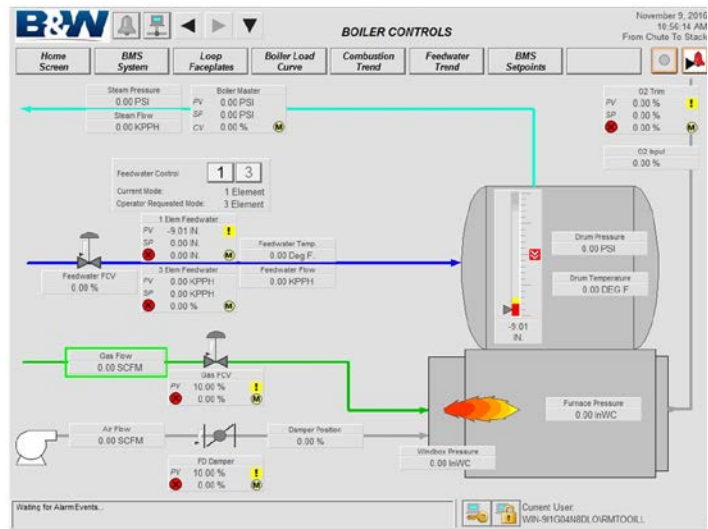


Submerged Grind Conveyor

Controls, Diagnostics and Plant Optimization Systems

Boiler and furnace controls and monitoring systems

- DCS and PLC systems
- Industrial water-tube boiler controls
- Combustion tuning and diagnostic systems
- Combustion and burner management systems
- Gas temperature measurement and monitoring
- Drum level gauges
- Furnace camera systems
- Heat transfer sensors

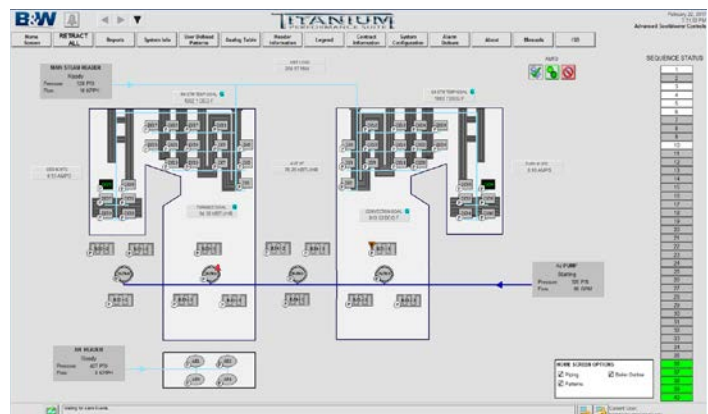


Titanium™ sootblowing controls and intelligent cleaning systems

- Intelligent sootblowing systems
- Advanced sootblower controls

Precipitator controls and software

- Precipitator Manager™ software
- SQ-300®i hybrid automatic voltage control
- PRC-100® programmable rapper control
- Remote diagnostics





Engineering and Support Services

In addition to our wide range of quality products, we also provide these engineering and support services:

- Equipment rebuilds and upgrades
- Construction and installation services
- Project management
- Startup and commissioning services
- Replacement parts
- Assured Stock Program® inventory management services
- Customer alliances
- Field engineering
- Numerical modeling
- Engineering studies
- Managed maintenance programs
- Outage planning
- Condition assessment services
- Advanced performance control technologies
- Field testing and inspections
- Laboratory testing
- Chemical cleaning
- Water treatment
- Equipment monitoring
- Training programs and seminars

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