

Valmet BFB Boiler

Bubbling Fluidized Bed technology



Valmet BFB Boiler provides the widest fuel flexibility

Valmet's boiler solution utilizing bubbling fluidized bed (BFB) combustion technology – Valmet BFB Boiler – features wide fuel flexibility, high combustion efficiency, high reliability, excellent controllability and low emissions. These benefits have turned it into a real winner with over 220 new deliveries and boiler conversions around the world.

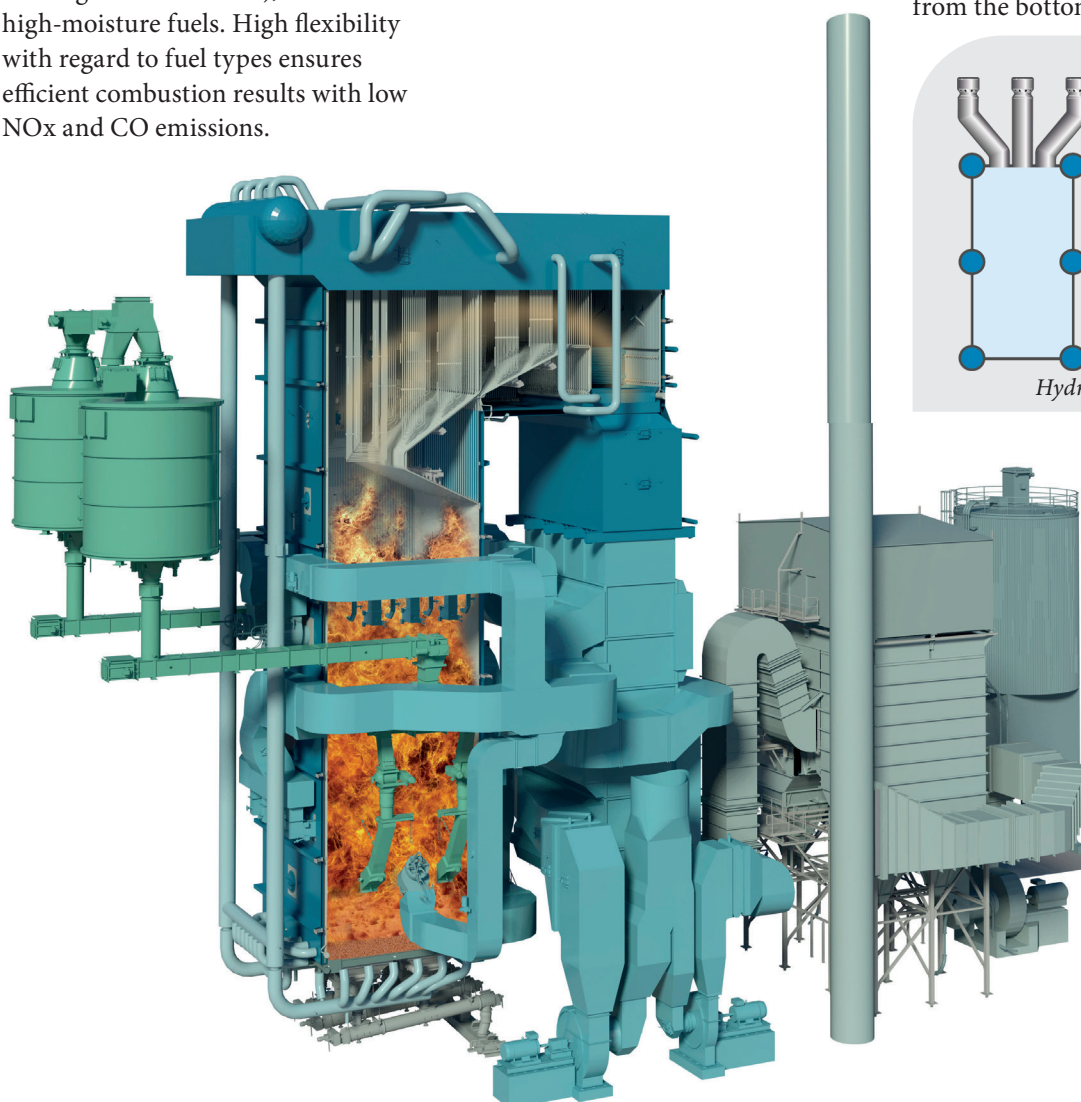
Combustion efficiency of over 99%

Valmet BFB Boilers (formerly HY-BEX boilers) are available in the size range from 20 to 400 MW_{th}. Their proven technology and design ensure excellent combustion results. You can count on high combustion efficiency of over 99%, resulting in boiler efficiency typically around 90% (according to EN standard), even with high-moisture fuels. High flexibility with regard to fuel types ensures efficient combustion results with low NO_x and CO emissions.

Straightforward design and proven technology

The BFB combustion principle is based on the fluidization of a sand bed. Hot bubbling sand and solid fuel are mixed together in the lower part of the furnace. The high heat capacity of the sand bed ensures fast fuel combustion and absorbs fluctuations in fuel quality.

The fundamental core of Valmet BFB Boiler is the patented Hydro Beam grate. It has been specifically developed to counter challenges caused by increasingly demanding fuels. The Hydro Beam grate enables efficient and reliable removal of impurities and coarse material from the bottom of the furnace. Over 30% of the rigid and water-cooled grate construction area is open for easy removal of ash from the bottom.





Did you know that Valmet has delivered more than 220 BFB boilers and conversions since 1979?

Top-class reliability

Valmet BFB Boiler typically requires only one short 7-to-14-day planned inspection and maintenance shut-down annually. Unplanned shut-downs and maintenance stops rarely occur, thanks to top-class reliability.

Wide fuel flexibility

Cost efficiency is one of the main concerns on every energy producer's mind. Wide fuel flexibility is a tool to achieve it. You will be able to use the most cost-efficient fuel currently available.

Valmet BFB Boiler is able to run on fuels with a high moisture content and low heat value, such as wet biomasses and different types of process sludges. Dry biomass is a suitable fuel as well, with references ranging from 15–65% moisture content.

Typical recovered fuels suitable for Valmet BFB Boiler include recycled wood, recovered industrial waste and processed municipal waste (RDF).

Many of our BFB references are operating with various complex mixtures of biomass and recovered fuels.

Efficient control of flue gas emissions

To improve your plant's environmental performance and meet even the most stringent emission limits, Valmet offers a wide range of in-house flue gas cleaning solutions. They include the staged combustion air system, selective non-catalytic reduction (SNCR) or selective catalytic reduction (SCR) systems, electrostatic precipitators, fabric filters with additive injection and flue gas condensing scrubbers.

Typical fuels

- Wood-based biomass
- Recycled wood
- Industrial residues
- Process sludges
- Wastewater treatment sludge
- Agro fuels
- Refuse Derived Fuels (RDF)

Why choose Valmet BFB Boiler?

Wide fuel flexibility

- From biomass to sludge and recovered fuel

High reliability

- Proven design
- Well-functioning removal of impurities with the patented Hydro Beam grate

High efficiency

- Combustion efficiency over 99%
- Boiler efficiency typically around 90%

Low emissions

- Low NO_x emissions through combustion air staging
- Low CO emissions due to good combustion air and fuel mixing

Low maintenance costs

- Robust construction, no moving parts

Wide thermal capacity range

- Thermal capacity from 20 to 400 MW_{th}

Customized service support and Valmet Industrial Internet

- Remote services through Valmet Performance Center
- Valmet Industrial Internet solutions for performance improvement
- Extensive local network and support

Strong focus on research and technology development

Located in Tampere, Finland, Valmet's energy R&D center focuses on fluidized bed boilers, pyrolysis and environmental systems. It combines the company's energy technology knowledge with state-of-the-art equipment.

Since 1990, the center has tested over 9,000 tons of various fuels and accumulated test data for over 50 fuels and over 100 fuel mixtures for operation in fluidized bed boilers.

The center serves both Valmet's own R&D work and our customers' development projects. The pilot-sized plant is important in bridging the gap between laboratory tests and a demonstration plant.



References



Ørsted's Asnaes power plant is one of Denmark's largest energy producers. A key role in its coal phase-out is played by a 128 MW_{th} biomass-fired Valmet BFB Boiler. The conversion from coal to wood chips is estimated to reduce CO₂ by an amount that corresponds to the annual emissions from approximately 400,000 cars.



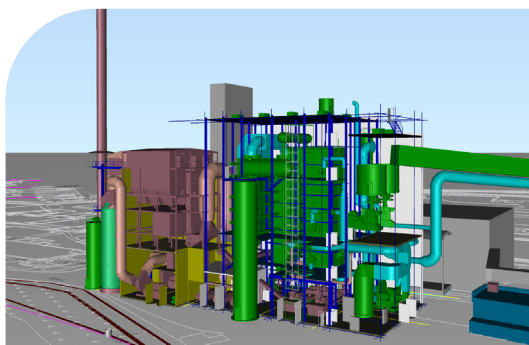
The woodchip-fired heating plant of **Tampereen Sähkölaitos** in Tampere, Finland, reduces the need to use heavy-fuel-oil-fired heating plants, thus lowering the CO₂ emissions generated in district heat production. Special attention has been paid to reducing noise and emissions through noise suppression technology, the choice of machinery, a triple-field electrostatic precipitator and a flue gas condenser, among others.



Dalkia Factice is the largest biomass plant in France. Located in Factice, in the southwest part of the country, this combined heat and power plant mainly uses bark and forest residues as fuel to produce 50 MW of electricity for the national grid and 74 MW of process steam.



In 2020, **JSC Mondi Syktyvkar** started up one of Russia's largest biomass boilers using BFB technology. The boiler with a nominal steam capacity of 184 MW_{th} has been designed for wet (60% moisture) mixture of bark and mill sludges. Equipped with four low-NO_x natural gas load burners, it can be operated simultaneously with solid fuel and natural gas or even only with natural gas.



Norske Skog Bruck in Austria will improve cost competitiveness, reduce its carbon footprint and create new business opportunities beyond publication paper manufacturing by generating revenue from the combustion of refuse-derived fuels (RDF). A complete Valmet BFB Boiler plant with a fuel power of 56 MW will be finished in spring 2022. It will run mainly on RDF, pulper rejects and sludge.

Valmet Industrial Internet solutions and remote services for energy

The Valmet Industrial Internet (VII) offering covers an extensive range of energy solutions and applications.

Through remote solutions and intelligent automation technology, Valmet's experts offer support in technical challenges whenever needed. Processes, troubleshooting and corrections can be monitored and performed remotely. Using the capabilities of the Industrial Internet, process operations are optimized based on vast monitoring data.

Remote solutions turn Valmet's expertise into concrete benefits through minimized downtime, improved energy efficiency and reduced operational costs. In addition, mobile solutions help your operators work as effectively and efficiently as possible.

Valmet Industrial Internet - VII solutions for energy

Reliability

Recognize threats to plant availability proactively

Energy Efficiency

Discover efficiency improvement potential in real time

Environment

Control emissions and minimize use of consumables

Production Capacity

Capture potential of maximum and minimum capacity in real time

Fleet Management

Balance supply with demand accurately
Compare performance against set targets

Data Discovery

Discover how data analytics can solve process challenges

Valmet Performance Center

Easy access to Valmet process specialists to support on plant operation



Process technology



Services

Automation

- Approx. 100 service centers
- 98 sales offices
- 43 production units
- 16 R&D centers

Unique offering covers process technology automation and services

Valmet's automation solutions are designed to be reliable and cybersecure as well as to maximize the profitability of our customers' businesses by improving their production performance and their cost, material and energy efficiency.

Solid experience from technology combined with process know-how and automation form the base for our innovative product and service development aimed at improving the efficiency and competitiveness of our clients.

To support our customers in the best possible way, we combine our long experience with the latest findings in energy solutions. With a global team of engineers and experts, Valmet offers a full range of customized support services to meet your local

challenges. Our own workshops and local staff ensure fast and safe service implementation.

Automation solutions

Valmet DNA distributed control system (DCS)

Industrial applications

- Boiler controls
- Turbine controls
- Balance of plant controls
- Boiler and turbine protection (SIS)
- Cybersecurity solution
- Condition monitoring
- Process optimization
- Performance monitoring and reporting

Analyzers and measurements

- Boiler diagnostic systems

Industrial Internet solutions

Automation services solutions

- Spare parts
- Maintenance and technical support
- Cybersecurity services
- Lifecycle services and upgrades
- Condition monitoring services
- Process performance services

Learning services

- Training simulators

Customized support services

- Performance services
- Competence development
- Boiler and plant upgrades
- Maintenance services
- Components and parts
- Support products



Valmet's professionals around the world work close to our customers and are committed to moving our customers' performance forward – every day.



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