

Benchmark with Edge Controller

High-Efficiency Boilers



The Benchmark: Unmatched Reliability and ROI

More than 25 years ago, AERCO introduced the first condensing and fully modulating boiler for the commercial market. Building on that leadership and experience, AERCO launched the Benchmark family of boilers in 1997. Ever since, Benchmark boilers have been considered the gold standard in hydronic heating and have set the bar for high efficiency. More importantly, they continue to deliver significant ROI to thousands of customers including increased energy savings, reliable heat, and lower installation and operational costs — all in a space-saving, compact footprint.

Saves Space, Easy to Install

The Benchmark is a powerful boiler packed into a small footprint. Each stainless steel unit fits through standard doorway and can travel via elevators – no need to tear down walls, use cranes or other expensive tools. In fact, our Benchmark 6000 is the smallest of its kind – up to a third the size of the competition.

Simple to Service

Removable enclosure panels provide easy access to all piping making the Benchmark extremely easy to service which simplifies lifetime maintenance. It's also compatible with popular EMS software, and can be remotely controlled providing detailed LCD diagnostics that can help prevent any issues from developing.

Superior Construction for Greater Uptime Reliability

AERCO's 439 stainless steel heat exchanger delivers a longer life through a simplified design that has only two moving parts. The condensing heat exchanger design is built to withstand thermal shock and eliminates the need for traditional boiler pumping equipment. The forced draft, modulating burners operate with unmatched turndown to minimize cycling and maximize seasonal efficiency while simplifying the venting system. AERCO's patented air/fuel delivery system and fully modulating burner reduces cycling losses, as well as wear and tear.

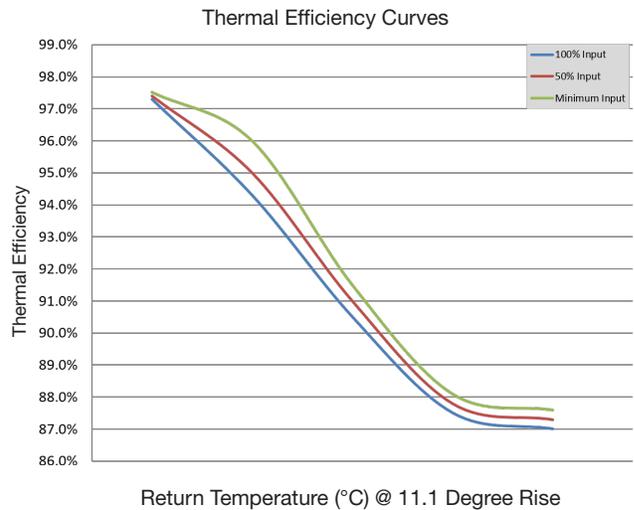
10-year Warranty

AERCO stands behind its products. The heat exchanger in the Benchmark boilers have a 10-year full (non-prorated) warranty.

High Efficiency, Increased Energy Savings

Benchmark Models as approved and listed on the AHRI Directory	Thermal Efficiency, 100% Input (High Fire) 37°F Temperature Differential (27 - 82°C)
BMK 750	95.6%
BMK 1000	96.8%
BMK 1500	94.6%
BMK 2000	94.6%
BMK 2500	93.5%
BMK 3000	93.5%
BMK 4000	94.1%
BMK 5000N	94%
BMK 5000	93.9%
BMK 6000	94.5%

Data listed is preliminary and is subject to change without notice



*For BMK 1000

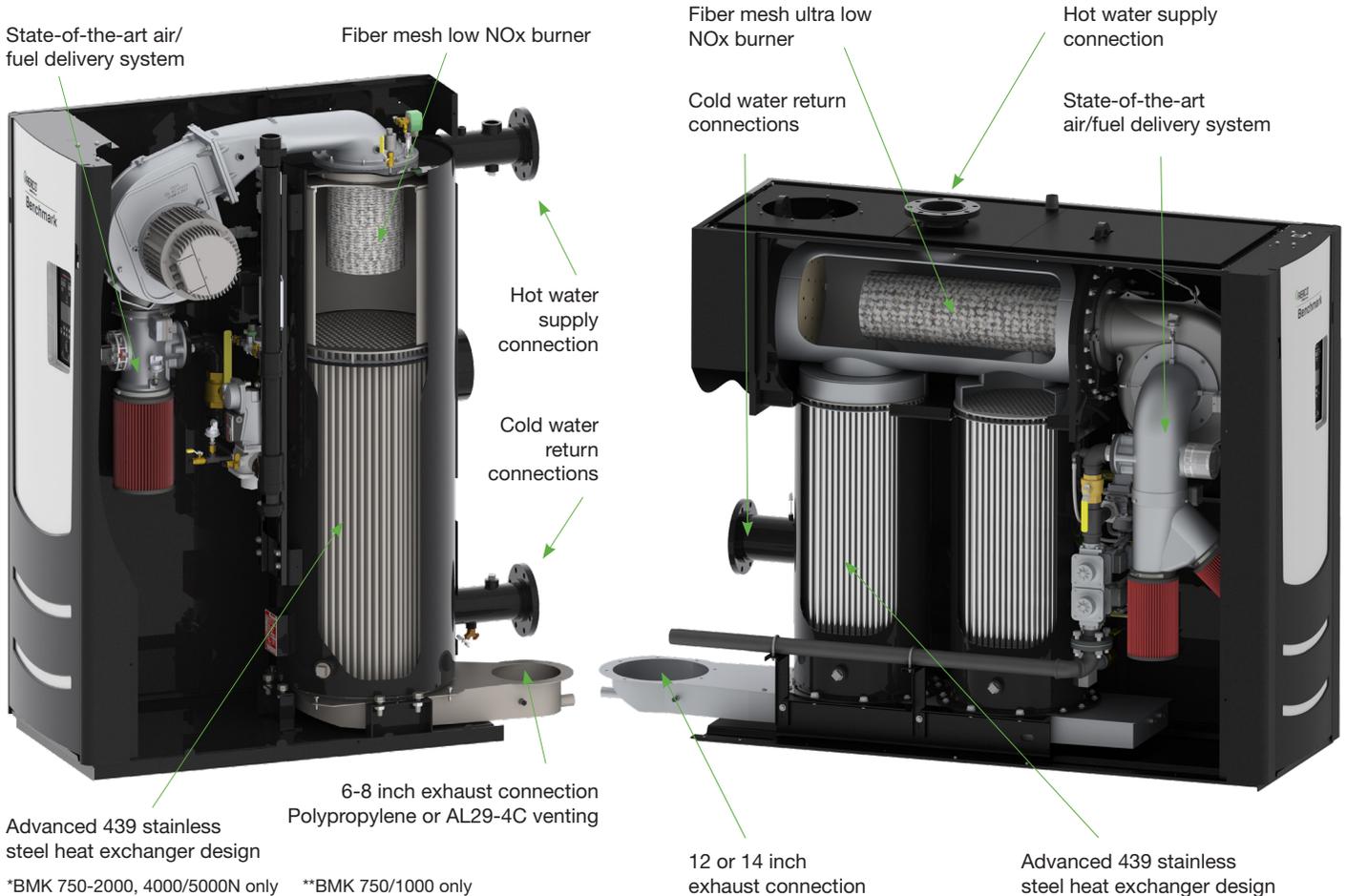
State of the Art Technology and Features

Benchmark 750, 1000, 1500, 2000, 2500, 3000, 4000, 5000N

- 15:1-20.1 turndown
- Oxygen level (O₂) monitoring
- Durable and reliable 439 Stainless Steel firetube heat exchanger
- Capable of variable primary flow installations
- Low NOx emissions (20 ppm or less at all firing rates)
- 9 ppm optional calibration*
- Compact footprint – all models fit through standard doorway
- Ducted combustion air capable
- Venting versatility with AL29-4C, Polypropylene, CPVC**, or PVC**
- Available in natural gas, propane, and dual fuel
- Optional gas train with VPS (Valve Proving System) for 4000 and 5000N models

Benchmark 5000, 6000

- 12.5:1-15:1 turndown
- Oxygen level (O₂) monitoring
- Durable and reliable 439 Stainless Steel firetube heat exchanger
- Capable of variable primary flow installations
- Low NOx emissions (20 ppm or less at all firing rates)
- 9 ppm optional calibration (BMK6000 requires 350 mm exhaust venting)
- Compact footprint – up to a third the size of the competition
- Ducted combustion air capable
- Venting versatility with AL29-4C, Polypropylene
- Available in Natural Gas and Dual Fuel
- Optional gas train with VPS (Valve Proving System)



Optimizing Your System

To optimize your system, Benchmark boilers come standard with our Boiler Sequencing Technology (BST) which shares the load between a few units to maximize energy efficiency. An additional way to ensure your system operates at peak performance is through our onAER Remote Monitoring Service detailed below.

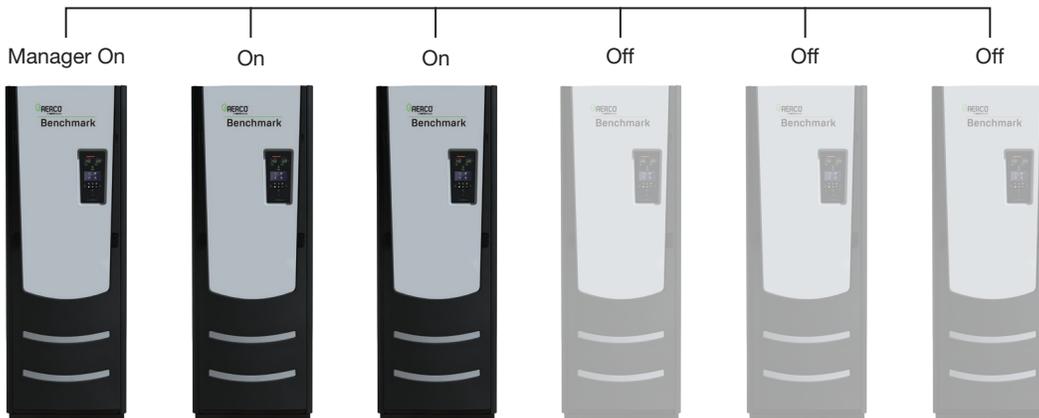
Boiler Sequencing Technology (BST) Maximizes Energy Efficiency

It requires less energy for a group of modulating boilers, each firing at “part load,” to heat a building, than for a single boiler operating at “full fire” to carry the entire workload. That’s why Benchmark boilers come standard with our Boiler Sequencing Technology (BST) enabling the load to be shared between a few units in order to maximize your system’s energy efficiency.

How it Works

To meet building demand, the BST employs as many boilers as available, each operating at its most efficient firing rate. Because the BST reacts in real-time (up to 16 boilers), users can take a unit offline for maintenance at any time or bring on back-up boilers for extremely cold conditions without changes to your system’s performance. And as individual boilers are added or deleted, the energy delivered is automatically adjusted to prevent fluctuations in the header temperature of the plant.

AERCO’s BST optimizes your system’s performance to increase uptime reliability, the longevity of your units and your Return on Investment.



Office Buildings



Education



Government



Multifamily Housing



Lodging



Environmental Stewards



The Greenspec® Listed Benchmark boilers are perfect for “green” designs. Their small footprint, flexible venting/piping options, high efficiency and lower operating costs can help facilities earn LEED points. Benchmark has been designed with several environmental advantages:

O₂ Monitoring System

Benchmark units are available with AERCO’s proprietary O₂ monitoring system, which displays the oxygen level directly on the Edge [i] controller in real time. It can be monitored via Modbus, so customers can measure emission levels and fuel combustion efficiency to maximize fuel economy.

Low NO_x Burner

Benchmark boilers are fitted with a low NO_x burner whose emissions consistently meet the highest regulatory standards. Ultra low NO_x (9 ppm or less) calibrations are available.*

Edge [i] Advanced Controls

The Edge [i] Control System optimizes the efficiency and operation of your system by combining temperature and operating controls, combustion safeguards and fault enunciator functions – all at your fingertips.

Benefits include:

- Simplifies diagnostic troubleshooting
- User-friendly intuitive control
- Full integration with BAS and EMS systems
- Supports remote data monitoring and control
- Integrated Boiler Sequencing Technology (BST)
- Ensures fail-safe boiler operation (if external building controls fail)

*See tech data sheets for model specs.

Sample Installations



Education

SUNY Cortland University, New York

The 60-year-old centralized heating plant at the State University of New York at Cortland was outdated and extremely inefficient. Heating costs accounted for more than 40 percent of the college's energy budget. The old plant allowed much heat go to waste as the steam traveled from the plant to dozens of campus buildings. To update their heating plant, the college decided to decentralize their old system and installed AERCO Benchmark boilers in each building across campus. The \$12 million, two-year project replaced the old

central steam heating plant and its three-pipe network with 42 individual boilers going into 21 buildings. This allowed the heat produced by each boiler to remain in that structure as well as reduced the amount of natural gas used and eliminated maintenance costs needed for previous steam leaks in the old pipe system. As a result of incorporating AERCO Benchmark boilers, SUNY Cortland expects to save nearly \$600,000 in energy costs per year.



Healthcare

Massachusetts General Hospital, Massachusetts

The 8,825 m² Massachusetts General Hospital used a central steam plant to supply indirect heat exchangers for space heating and domestic hot water. The steam boilers also supplied primary energy for the facility's sterilization equipment. The building's single centralized steam system was meeting all the facility's needs, but it was far from efficient—coming in at a paltry 50 to 60%. To make matters more complicated, the final solution had to be small enough to make a six-flight elevator journey to a small mechanical room at the top of

facility. The engineering firm hired to help the hospital upgrade the building, found that the plant had to operate continuously to meet the facility's domestic hot water and sterilization needs. The combination of piping losses and inefficient operation at low load times compounded the problem. Decentralizing the domestic hot water system and converting to hydronic space heating was the best answer. AERCO's 94% efficient Benchmark 3000 and 96% efficient Innovations are easily meeting all the facility's heating, domestic hot water and sterilization needs—but are reducing fuel operating costs from 30 to 40%.



Multifamily Housing

Luxury High Rise Apartment Building, New York City

The distinctive 12-story luxury rental residential building offers 199 units in a mix of studios and one-, two- and three-bedroom apartments; along with amenities that include a state-of-the-art fitness center, gaming lounge, clubroom and more. The building was designed for high efficiency, incorporating a water source heat pump loop for space heating—so low inlet water temperatures and condensing equipment was a given. But the current plans for the building called for three 732 kW water-tube boilers to provide supplemental heating for the loop, along

with two 450-liter tanks for domestic water heating. This meant a more expensive installation, high horsepower pumps and larger piping, valves, and fittings, along with a pricey induced draft fan. Since AERCO fire-tube condensing water heaters and boilers didn't have the limitations of the current specified water-tube system, three Benchmarks 3000 were recommended for the job, along with three Innovation 1060s for the heating plant. The 96% efficient Benchmark 3000s and tankless Innovation 1060s were exactly what this apartment building called for. This luxury high rise got a much more energy and space efficient system, with substantially lower installation costs and electrical operating requirements.



Lodging

St. John's Hotel Gangneung, South Korea

St. John's Hotel has the honor of hosting the Olympic ice events at the 2018 XXIII Olympic Winter Games. The management of the large-scale hotel with a high hot water demand for amenities including 1,091 guest rooms, two outdoor pools, a lazy river, fitness center and restaurant, wanted a new, efficient system that would deliver energy savings. Nine compact Benchmark 3000 boilers were installed for space heating in the hotel. With unmatched 15:1 turndown, the BMK 3000 maximizes operating efficiency and seasonal fuel savings. It precisely

matches fluctuating loads to minimize boiler cycling and eliminates wasteful temperature overshoot — the operating efficiency of the BMK 3000 boiler actually increases as the load decreases. As with all members of the Benchmark series, the BMK 3000 consistently delivers <30ppm NOx at all firing levels, allowing it to meet the hotel's environmental performance criteria, as well. The operators of St. John's Hotel were able to improve system performance and efficiency, meet the hotel's high hot water demand despite load variations throughout the day, and save money: 30% reduction in installation time and costs, 30% reduction in fuel bills, 25% increased efficiency.



Education

Hamilton College, Clinton, New York

When school administrators of Hamilton College, the liberal arts school in upstate New York, planned to upgrade the heating and hot water systems in its ice rink and several student residences, they sought a local company to provide reliable, high efficiency USA-produced products that would deliver lower operating costs and a high return on investment (ROI). They chose AERCO Benchmark boilers and SmartPlate water heaters. Due to periodic upgrades and retrofits throughout the years, the college had installed several different

boilers and water heaters from multiple manufacturers, but the success and the return on investment, provided by AERCO equipment, led Hamilton officials to conclude that AERCO was their best choice when subsequent buildings needed to be upgraded. By making AERCO its primary supplier, the college saves time, simplifies training for the maintenance staff and streamlines its formerly large parts inventory. "We chose an AERCO combination system because it would provide us with reliability, flexibility and high efficiency while lowering our operating and maintenance costs," said William Huggins, Hamilton's Associate Director of Physical Plant for Building Services.



Industrial

Leading Aerospace Company, South Carolina

A leading aerospace company needed to install a 14 MW heating system for six paint curing booths. It had to fit in a very small space, have high turndown and not affect the existing boilers used for space heating. The booths had to maintain a very controlled temperature of 43-49°C to ensure proper curing. Eight Benchmark 6000 boilers—half the size of any other 1758 kW units on the market—fit in the existing mezzanine that measured approximately 65m² and sat above the space heating plant. No other boiler solution came close

to providing the BTUs in such a small footprint. Because the BMK 6000 boilers are condensing, venting was much smaller than alternative solutions, as well. The high 15:1 turndown was critical because the boiler room had to be designed to heat one curing booth or all six simultaneously. A field-proven stainless steel, fire-tube design satisfied the high reliability goals of the customer. The compact design of the BMK 6000 eliminated the considerable cost associated with designing and building a 18-meter long boiler room, which was required for the next smallest solution. Fuel savings are maximized by the BMK 6000's modulating design, making the curing booths as energy-efficient as possible.

Installation Advantages

Venting Versatility for Easy Installation

Benchmark products provide numerous venting options including sidewall, through-the-roof, and ducted combustion capabilities (direct-vent). They're approved for venting with PVC, CPVC, Polypropylene, or AL29-4C materials and provide broad installation flexibility and savings.

Due to its high efficiency and low flue gas temperatures, the Benchmark 6000 can be installed with 300mm flue venting – no other 1758 kW boiler is able to use polypropylene venting under all operating conditions. Not only does the ability to use polypropylene venting prove the Benchmark 6000's superior efficiency, but it also provides big savings on total cost, as well as the flexibility to customize its fit making the units even easier to install.

Space-saving Design

All Benchmark products are delivered as a single, fully assembled unit. Its small footprint, doorway size, and quiet operation make it ideal for both new construction and retrofit applications. The Benchmark 6000 is the most compactly designed 1758 kW boiler in the market – up to a third the size of the competition.

Zero Side Clearance for Easy Maintenance

The redesigned Benchmark can be serviced via the front or top of the boiler, as well as the side. This flexibility allows units to be configured side by side.

Consult an AERCO representative for additional venting configuration inquiries.

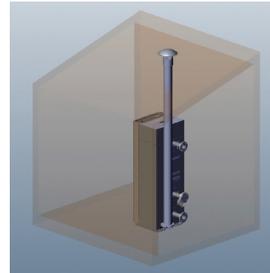


BMK Platinum 3000

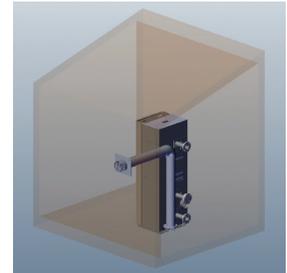


Outdoor solution available

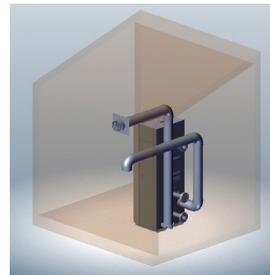
Vent Configurations



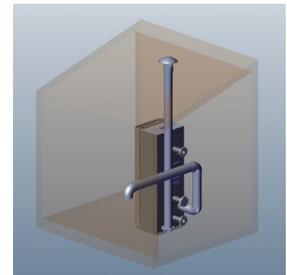
Vertical vent/room air



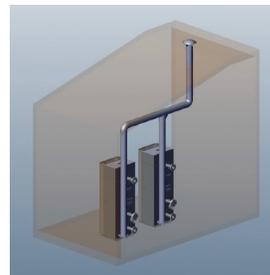
Sidewall vent/room air



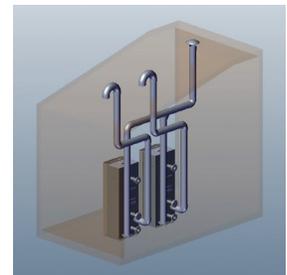
Direct-vent



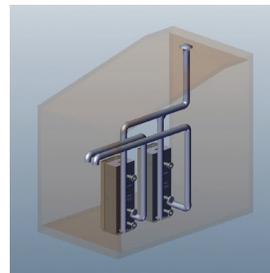
Vertical vent/sidewall air



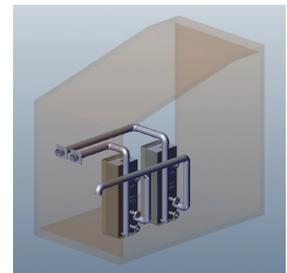
Common vertical vent/room air



Common vertical vent/individual vertical air



Common vertical vent/individual sidewall air



Individual sidewall vent/common sidewall air

Consult an AERCO representative for additional venting configuration inquiries.

Accessories



AERCO Control System (ACS)

The ACS maximizes heating plant efficiency if your heating plant has more than 16 boilers or if you are designing a combination control system. The ACS relay panel provides additional pump and valve control for several combination control configurations.



Motorized Valves

The Belimo F6...HDU Series 2-way butterfly valves are designed to meet the needs of HVAC and commercial application requiring bubble tight shut-off for liquids. Typical applications include boiler isolation, chiller isolation, cooling tower isolation, change-over systems, air handler coil control, bypass and process control applications. Valves specifically designed for easy installation on BST configured boiler plants are available as well.



Boiler Sequencing Technology (BST) Integration Panel

BST boiler plants have this option available to enable the BST Manager to automatically switch an Edge [i] Client to the BST Manager control if the currently designated Manager is not able to manage the boilers in the plant. The change is automatic so there is no need for a technician to intervene. The Edge [i] controller may change from a Client to a Manager if a unit is taken down for service or if there is a fault that disables the controller currently acting as the BST Manager. The panel is the connection point for the Modbus sensors used by the BST Manager Control. This allows the signal input of any sensors attached to the Integration Panel to be accessed at any node on the BST communication cables.



AERCO Protonode/Gateways

AERCO offers a multi-protocol, communications gateway to support integration with customers' building control and energy management systems. The plug-n-play package supports integration with BACnet/IP, BACnet MS/TP, LonWorks, and Johnson Controls Metasys N2 systems. AERCO's Communications Gateway is available for all AERCO boilers, water heaters and electronically controlled indirect systems.



Condensate Neutralizer Kit

AERCO Condensate Neutralizers are ideal for condensing boilers and furnaces operating on natural gas or propane. The condensate is acidic and has the potential to harm the environment and the sewer system. The AERCO Condensate Neutralizer will raise the pH of the condensate to a more neutral level before it is discharged to drain.



Buffer Tanks

AERCO buffer tanks are ASME certified pressure vessels designed for use with high efficiency, low volume systems that incorporate low-mass condensing boilers. They add thermal mass, dampen fast transitions and minimize boiler cycling that occurs during zero or low domestic load conditions. Available in two and four-port (Primary-Secondary) configurations.



Venting Mufflers

AERCO offers 150, 200 and 300 mm exhaust mufflers that are specifically designed with flanged ends to fit directly on the exhaust manifold of Benchmark boilers. The flanged-end design allows the muffler to be used with any venting system manufacturer – the only adapter required is an AERCO starter piece at one or both ends of the muffler.

Specifications and Dimensions

	750	1000	1500	2000	2500
Adjustable Temp. Control	10°C to 88°C	10°C to 88°C	10°C to 88°C	10°C to 88°C	10°C to 88°C
Ambient Temperature	-17.8°C to 54°C	-17.8°C to 54°C	-17.8°C to 54°C	-17.8°C to 54°C	-17.8°C to 54°C
Accuracy	±2°C	±2°C	±2°C	±2°C	±2°C
Input (Nat. Gas)	220 kW	293 kW	439 kW	586 kW	732 kW
Net Output (Nat. Gas)	191-211 kW	255-281 kW	382-418 kW	50-556 kW	637-691 kW
Turndown Ratio	15:1	20:1	20:1	20:1	15:1
Flue Size Diameter	152.4 mm	152.4 mm	152.4 mm	203.2 mm	203.2 mm
Flue Material (per local code)	PVC, CPVC, PP or AL29-4C	PVC, CPVC, PP or AL29-4C	AL29-4C, PP	PP or AL29-4C	PP or AL29-4C
Water Inlet and Outlet	76.2 mm 150# Flange	76.2 mm 150# Flange	101.6 mm 150# Flange	101.6 mm 150# Flange	101.6 mm 150# Flange
Gas Connection	25.4 mm NPT Male	25.4 mm NPT Male	50.8 mm NPT Male	50.8 mm NPT Male	50.8 mm NPT Male
Gas Pressure Requirements*	35 mbar Maximum, 10 mbar Minimum at Full Load				
Min/Max Water Flow	45-663 LPM	45-663 LPM	95-946 LPM	95-1325 LPM	95-1325 LPM
Pressure Rating	11 bar at 98.8°C	11 bar at 98.8°C	11 bar at 98.8°C	11 bar at 98.8°C	11 bar at 98.8°C
NOx Emissions Certifications	SCAQMD, TCEQ	SCAQMD, TCEQ	SCAQMD, TCEQ	SCAQMD, TCEQ	SCAQMD, TCEQ
Standard Listing and Approvals	UL, CUL, ASME	UL, CUL, ASME	UL, CUL, ASME	UL, CUL, ASME	UL, CUL, ASME
Gas Train Options	FM Compliant or Factory Installed, Double Block and Bleed (Formerly IRI)				
Electrical Requirements	230V/1PH/ 50-60Hz	230V/1PH/ 50-60Hz	230V/1PH/ 50-60Hz	230V/1PH/ 50-60Hz	380V/3PH/ 50-60Hz
Water Press. Drop	21 kPa @ 6.3 LPS	21 kPa @ 6.3 LPS	21 kPa @ 10.7 LPS	21 kPa @ 10.7 LPS	22 kPa @ 15.8 LPS
Water Volume	106 liters	98 liters	167 liters	151 liters	227 liters
Weight, Installed (dry)	303 kg	318 kg	638 kg	680 kg	907 kg

*Values are for Natural Gas FM Compliant gas trains only. See Benchmark Gas Components & Supply Design Guide GF-2030 for Propane, DBB & Dual Fuel gas train gas pressure requirements.

Model	Width	Depth	Height	Model	Width	Depth	Height
BMK 750	711 mm	622 mm	1981 mm	BMK 3000	711 mm	1422 mm	1981 mm
BMK 1000	711 mm	635 mm	1981 mm	BMK 4000	864 mm	1590 mm	1981 mm
BMK 1500	711 mm	1107 mm	1981 mm	BMK 5000N	864 mm	1590 mm	1981 mm
BMK 2000	711 mm	1107 mm	1981 mm	BMK 5000	890 mm	2269 mm	2027 mm
BMK 2500	711 mm	1422 mm	1981 mm	BMK 6000	890 mm	2269 mm	2027 mm

Data listed is preliminary and are subject to change without notice. Please find complete dimensions on the Benchmark tech data sheet.

Specifications and Dimensions

	3000	4000	5000N	5000	6000
Adjustable Temp. Control	10°C to 88°C	10°C to 88°C	10°C to 88°C	10°C to 88°C	10°C to 88°C
Ambient Temp.	-17.8°C to 54°C	-17.8°C to 54°C	-17.8°C to 54°C	-17.8°C to 54°C	-17.8°C to 54°C
Accuracy	±2°C	±2°C	±2°C	±2°C	±2°C
Input (Nat. Gas)	879 kW	1172 kW	1462 kW	1465 kW	1,758 kW
Net Output (Nat. Gas)	764-843 kW	1020-1149 kW	1271-1433 kW	1275-1407 kW	1529-1661 kW
Turndown Ratio	15:1	15:1	20:1	12.5:1	15:1
Flue Size Diameter	203.2 mm	305 mm	305 mm	355 mm / 305 mm Optional	355 mm / 305 mm Optional
Flue Material (per local code)	PP or AL29-4C	PP or AL29-4C	PP or AL29-4C	PP or AL29-4C	PP or AL29-4C
Water Inlet and Outlet	101.6 mm 150# Flange	152.4 mm 150# Flange	152.4 mm 150# Flange	152.4 mm 150# Flange	152.4 mm 150# Flange
Gas Connection	50.8 mm NPT Male	76.2 mm NPT Male	76.2 mm NPT Male	50.8 mm / 76.2 mm NPT Male	50.8 mm / 76.2 mm NPT Male
Gas Pressure Requirements*	35 mbar Maximum, 10 mbar Minimum at Full Load			138 mbar Maximum, 35 mbar Minimum at Full Load	
Min/Max Water Flow	95-1325 LPM	125-1893 LPM	125-1893 LPM	284-2271 LPM	284-2271 LPM
Pressure Rating	11 bar at 98.8°C	11 bar at 98.8°C	11 bar at 98.8°C	5.5 bar at 98.8°C / 10 bar at 98.8°C	5.5 bar at 98.8°C / 10 bar at 98.8°C
NOx Emissions Certifications	SCAQMD, TCEQ	SCAQMD, TCEQ	SCAQMD, TCEQ	SCAQMD, TCEQ	SCAQMD, TCEQ
Standard Listing and Approvals	UL, CUL, ASME	UL, CUL, ASME	UL, CUL, ASME	UL, CUL, ASME	UL, CUL, ASME
Gas Train Options	FM Compliant or Factory Installed, Double Block and Bleed (Formerly IRI)	FM Compliant or Factory Installed, Double Block and Bleed (Formerly IRI), with Valve Proving System (VPS)			
Electrical Requirements	380V/3PH/50-60Hz	380V/3PH/50-60Hz	380V/3PH/50-60Hz	380V/3PH/50-60Hz	380V/3PH/50-60Hz
Water Press. Drop at 20°ΔT	22 kPa @ 15.8 LPS	34 kPa @ 30 LPS	34 kPa @ 30 LPS	28 kPa @ 31.5 LPS	28 kPa @ 31.5 LPS
Water Volume	208 liters	292 liters	292 liters	416 liters	416 liters
Weight, Installed (dry)	984 kg	1134 kg	1134 kg	1361 kg	1361 kg





Heating and Hot Water Solutions

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