# Benchmark<sup>®</sup> with Edge<sup>®</sup> Controller

High-Efficiency Boilers







# Smart, Powerful Boiler Built to Last

In an *ideal world*, high efficiency, commercial condensing boilers would operate as designed – condensing as you expect and delivering the highest efficiency possible.

However, in the *real world*, external variables arise causing faults and problems that can wreak havoc on your system, such as:

- Combustion O<sub>2</sub> level fluctuations
- Air temperature and pressure changes
- Humidity, occupancy/load variations
- Low ∆T operation
- Gas quality and pressure changes

These problems lead to system inefficiency, increased utility costs, unit downtime and costly unscheduled maintenance.

### A Smarter Way to Heat

The Benchmark, the "Smart Boiler," optimizes your system for the real world by selfcorrecting these problems and giving you predictive maintenance tools to ensure your system operates optimally, maximizes efficiency and delivers big savings.

### Industry-Leading Warranty

Gives you among top of class coverage so you can rest easy knowing you've bought a reliable, premium system that will last for years to come.



Smallest footprint in the industry translates to big installation savings!

# **Provides Lowest Cost of Ownership**

Edge Advanced Controller	<ul> <li>Designed to save you time and money, and make system operation easier resulting in the lowest cost of ownership.</li> <li>Save money by reducing install, start-up and annual operating costs</li> <li>Simplify start-ups and maintenance</li> <li>Strengthen system design, performance and efficiency</li> <li>Edge Mobile App enables full unit setup and control as well as enhanced diagnostics and configuration capabilities</li> </ul>
AERtrim Patented O <sub>2</sub> Trim	<ul> <li>Ensures your system works properly with precise air/fuel ratios during combustion, lowering operating and maintenance costs.</li> <li>Self-adjusts the combustion process to ensure optimal O<sub>2</sub> levels despite ever-changing environmental factors unrelated to the boiler itself</li> <li>Saves energy and lowers operating costs by delivering the exact fuel needed</li> <li>Reduces unscheduled maintenance</li> <li>Increases condensing zone in heat exchanger to maximize efficiency and deliver additional seasonal efficiency gains</li> <li>Decreases emissions</li> </ul>
ONAER Predictive Maintenance	<ul> <li>Allows access to real-time system performance so you're not merely correcting faults, but predicting when you need to take action to prevent them.</li> <li>See exactly how efficient your units and plants are, how many cycles per hour, O<sub>2</sub> levels and more</li> <li>Know at-a-glance when you need to perform maintenance</li> <li>Pro-actively review data and trends to ensure units are operating optimally</li> <li>Receive instant alerts if a unit is down and see which ones need attention - view possible causes and suggested actions</li> </ul>
Dual Returns Maximum Efficiency	<ul> <li>Keeps high temperature and low temperature return water separate to increase the heat exchanger's condensing zone, maximizing efficiency.</li> <li>Improves overall system plant thermal efficiency by up to an additional 7%</li> <li>Extends boiler condensing operating hours</li> <li>Saves energy</li> <li>Allows engineers to design customized systems with diverse load demands specific to a site/project</li> </ul>

# Edge<sup>™</sup> Controller with Advanced Technology

With advanced features such as EZ Setup, Combustion Calibration Assist, and a mobile app that enables full unit setup and control, the Edge Controller is specifically designed to save you time and money, and make system operation easier resulting in the lowest cost of ownership. Edge also delivers many industry firsts including flow balancing, combination plant setup through manager, (i.e., setup and manage two boiler groups for heating and hot water with swing boilers in combination plant), Combustion Calibration Assist, and the ability to submit service forms to AERCO directly from the app.



### Save

Edge Controller saves valuable time and money by reducing install and start-up costs.

- Flow Balancing eliminates balancing valves and reduces commissioning costs
- Built-in communication for BACnet IP, BACnet MS/TP, Modbus IP, Modbus RTU (no gateway required)
- · Save on boiler plant size and initial investment when using swing boilers

### Simplify

Edge simplifies start-ups and maintenance cutting time up to 50% enabling even the most complex systems to be setup in minutes through intuitive, guided instructions.

- · Easily calibrate units with Assisted or Manual options saving up to 50% time
  - Assisted: guided steps that automatically adjust precise air/fuel ratios for optimal performance
  - Manual: all necessary parameters in a comprehensive, user-friendly interface
- · Upload known settings without having to redo the same steps for each unit in the plant
- View important unit and plant performance details without sifting through multiple screens







Swing boiler

DHW boiler

Swing valve

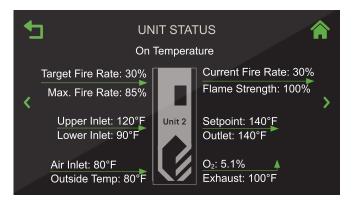
COMBUSTION CALIBRATION COMPLETE							
Valve Position (%)	0 <sub>2</sub> (%)	NOx (ppm)	CO (ppm)	Flame Strength (μA)			
16	8.0 🏓	29 🏓	170 🏓	2 🏓			
20	5.5 🌒	8 🌒	70 🌘	6 🌒			
40	8.0 🎈	29 🏓	170 🏮	2 🏓			
60	5.5 🌒	8	70 🌘	6 🌒			
80	5.5 🌘	8 🌒	70 🌘	6 🌒			
100	8.0 🏓	29 🎈	170 🎈	2 🏓			
Downstream Gas Pressure: 2.2 in. WC Completed on 3/27/2019							

# Designed to Save, Simplify and Strengthen

### Strengthen

Edge strengthens performance by optimizing the overall system and increasing efficiency.

- Enhanced connectivity including Bluetooth, Wi-Fi, Ethernet, and Modbus
- · Easily troubleshoot with visual ignition sequence
- Allows AERCO boilers and water heaters to operate with a single controller and work together for smoother, more efficient operation
- Provide easy combination plant setup with two boiler groups for simultaneous yet independent heating and DHW temperature control
  - Unique swing boilers with swing valves control for heating and DHW with SmartPlate control
- Trend multiple parameters simultaneously for a more holistic insight on the health of system
- Variable speed pump control optimizes boiler efficiency in primary secondary applications



<b>•</b>	UNIT EVENT HIST		
	Event	Date/Time	
	🔶 Delta-T Warning	12-Oct, 3:23 PM	
	♦ O₂ Level Warning	12-Oct, 2:23 PM	
	Exhaust Temp High	11-Oct, 3:25 PM	
<	Airflow Fault During Purge	10-0ct, 8:23 AM	
	♦ O₂ Level Warning	12-Oct, 3:23 PM	
	🔶 Delta-T Warning	12-Oct, 3:23 PM	
	🔶 O2 Level Warning	11-Oct, 4:25 PM	
	Flame Loss During Run	10-0ct, 8:23 AM	
	Delta-T Shutdown	15-Oct, 9:22 AM	
	exhaust Temp High Warning	17-Oct, 4:20 AM	

### Mobile App

For greater flexibility, the Edge Mobile App enables full unit setup and control. The app incorporates all the functionalities as the touchscreen controller, but features the added benefit of enhanced diagnostics and configuration capabilities on a large screen. You'll also be able to trend multiple parameters of unit performance on one screen and submit service forms from the app. Edge Mobile App also gives you the freedom to move around the unit when configuring, diagnosing and troubleshooting.

			Unit	Status	♦ 69%	
•	Edge Benchmark 3000 c-tr-2xrv Controloge Con	Warmup 117 No FALLS Iso Valve State: Flame Strength: Current Blower Voltage: O; Statt Valve Position:	Open 100% 3.36 V 		Setpoint 120°F Outet 112° Air Iniet 66° Upper Iniet	
	Advanced Setup  Device List Service Form onAER	Start valve Position Target Valve Position Current Valve Position:			Exhaust	
		Benchmark 3000	UNIT EVENT HISTORY	O <sub>2</sub> AERtrim		



# AERtrim<sup>®</sup> – Patented O<sub>2</sub> Trim Technology

Advanced combustion control systems in high efficiency boilers need to maintain precise air/fuel ratios in order to work properly and maximize efficiency. However, environmental variations (such as humidity, atmospheric pressure, filter dust loading, delivered gas energy content and other factors) can often create problems in gas and oil-fired boilers causing them to deviate from the ideal oxygen-fuel ratio.

If O<sub>2</sub> levels are too low, it can cause unstable combustion resulting in faults and increased unscheduled maintenance. Conversely, if O2 levels are too high, the Dew Point will be lower and the boiler is less likely to condense - and if the boiler isn't condensing, you're not getting the energy savings you should.



Too Little O<sub>2</sub> - Flame loss or other faults - Increased emissions - Additional unscheduled maintenance



Condensing Zone 90% Efficiency 118° Dew Point

### **AERtrim Ensures Your System is** Working Properly; Lowers Operating and Maintenance Costs

AERCO's innovative, patented AERtrim monitors the actual conditions of the Benchmark and selfadjusts its combustion process to ensure your system is operating at optimal O<sub>2</sub> levels and peak system efficiency. With proper O2 levels, you'll have greater uptime reliability, save money with increased efficiencies, produce lower emissions, and create the ideal environment for condensing to occur.



### Optimal O<sub>2</sub> Levels

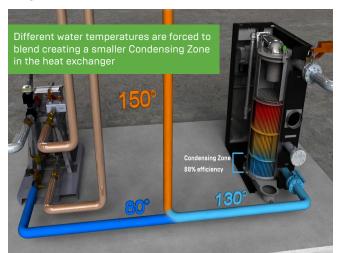
- Higher dew point
- Larger condensing zone
- Maximum efficiency
- Greater savings

Condensing Zone 95% Efficiency 130° Dew Point

U.S. Patent: 9.175.853

Most traditional boilers only have Single Returns which limit engineers to designing generic applications that force the blending of hot and cold water temperatures, reducing efficiencies. However, Benchmark's Dual Returns allow engineers to take full advantage of diverse load demands specific to a site and design a customized option that maximizes operational efficiencies.

### **Single Returns**



### **Dual Returns**



### Applications

Dual Returns are ideal for systems with multiple return water temperatures (higher  $\Delta T$  zones with lower return temperatures) and applications that include combination systems including:

- Space heating with domestic hot water combination systems
- Multi-zone space heating
- Radiant floor heating

- Pool heating
- Snow melt
- Air pre-heating and reheating
- · Supplementary heat for heat pump system



Space Heating and Domestic Hot Water

Pools

Snow Melt

AERCO's onAER Predictive Maintenance is an affordable, easy-to-use health of system monitoring that gives you instant access to unit performance details, event history, maintenance schedules and more. onAER helps ensure your system operates at peak performance while reducing cost of ownership.

### Reduce Cost of Ownership

- · Avoid lost revenue due to undetected equipment faults and downtime
- · Generate regular reports that aid in decision making and cost-saving improvements
- Prevent unnecessary wear-and-tear/premature failure of your equipment

### Increase Reliability and Energy Savings

- Optimize system performance with real-time data
- Identify energy-saving opportunities by trending multiple data points including efficiency, cycles per hour, O<sub>2</sub> levels, temperature readings, etc.

### Decrease Service Calls up to 50%

- Identify and fix potential issues before they become a problem and reduce labor costs from emergency service calls
- Implement a more responsive and scheduled maintenance plan

onAER typically identifies 4-5% system efficiency losses which can translate into \$2,000 to \$6,000\* in fuel savings

Plant BTU	10 Year Identified Savings
2,000,000	\$12,000
4,000,000	\$21,000
6,000,000	\$25,000
8,000,000	\$31,000
10,000,000	\$47,000
12,000,000	\$55,000
14,000,000	\$75,000
16,000,000	\$81,000

\*Based on typical AERCO heating system design

		onaer I	Predictive M	aintenance		Jane Smith	4 <b>°° «</b>
OVERVIEW     OVERVIEW     Image: Sites     Image: Sites     Image: Sites     Image: Sites     Account     Set-up	OVERVIEW To help ensure your A AERCD units are wort more information abd dragging and droppin in the panel's heading	ut a site or a unit, i g each panel head I-	e operating at peak perform moximum efficiency, which click on a site name or indiv ing to the location you woul	nce, the comprehensive su units need immediate atter dual unit status icon 🌵 be like them to appear. To mi	mmary below alk tion and which o low. You can also nimize, expand or	SEARCH was you to instantly kn nes require maintenan customize your screer remove a panel, click o	ow which ce. To view h by on the icons
HELP	SITES BY STATUS		~ / ×	FAVORITES			× 2 × 1
	WALKER UNIVERS		View All	Click on the sta	icon to see that un	t's Trending Graph below.	
	Buildings Ryan Hall	Plants 1 <sup>er</sup> Floor 2 <sup>er</sup> Floor	Units 000				Ê
	Library Science Center	Basement Lab I	•••			sker University Star	k College
	STARK COLLEGE	Lab 2					
	Buildings North Dorm	Plants 1 <sup>st</sup> Floor 2 <sup>st</sup> Floor	Units 0 0 0 0 0 0	ACTION REQU			Nev Al
	South Dorm	1" Floor 2" Floor		Serial # 0-00-0000 0-11-1111	Site Walker University Stark College	Event Maintenance overdue Flame loss during run	Date 10.18.16
	Recreation Center	Basement Annex	•••	0-22-2222	Walker University Walker University		09.0136
	✓ Matter University     ✓ Spectral     ✓ Spec	FOR UNIT G-00-000	20	CHICK STAT.           Secial           0	Site Wake University Back Colone WINTERS Building Plants Units Main App With BMS WINGS L/ Building Plants Units Natural 5	ot. Building 5 II ANDING - Edge Ci	ontroller
	80		0		AV5 Dom Plant of 2	n 2 with BMS II ND SNOW LABOR htroller	

# Simplify Service and Reduce Unscheduled Maintenance

### **Reduce Downtime with Instant Alerts**

- Receive immediate email alerts about a fault or decline in equipment performance
- Pro-actively resolve issues quickly
- Prevent more serious problems from developing

### Simplify On-Site Repairs

- Armed with performance and historical fault details technicians can arrive equipped with parts to allow them to work faster and more cost-efficiently
- View list of possible causes and suggested actions to help technicians fix problems quickly
- Submit maintenance/service and start-up forms via onAER

### Solve Non-Critical Problems on Your Time

- Schedule service at your convenience
- Minimize facility and occupant disruptions

# Secure, Remote Monitoring and Management

- Easily installed over secure, authorized ethernet connection
- Data travels outbound only eliminating any security risks
- Wi-Fi module is available to connect to your wireless network
- No firewall rules or changes necessary



### **TECHNICAL DATA**

Technical data for **Unit # G-10-5272** at Walker University is listed below. To add this unit's Trending Graph t "Add to Favorites" button at the right. To add a new start-up form, disable faults, enable shut downs, or rec performed, click on the green links below.

Site:	Walker University	Model:	Benchmark 2000	Add New Start-up Form
Building:	Ryan Hall	Sales Order:	13080750-1	Disable Faults for 24 Hours
Plant:	First Floor	Ship Date:	2013-08-27	Maintenance/Service Perfor
Unit Serial #:	G-10-5272	Local Rep:	GA Fleet	Extended Period Shutdown

#### STATUS OVERVIEW

Unit status:AutoAge of last heartbeat record:18263:46:45Total run cycles:532091

to Faults Enabled/Disabled: 263:46:45 Extended period shutdown:

bled: Disabled for xx hours/days Itdown: Enabled

Event: Flame Loss During Run							
Possible	Cause		Sugge	sted Action			
1. Faulty Water temperature switch.			1. Test t	he temperature	switch to	o insure it trips the ac	ctual water ten
2. Incorrec	2. Incorrect PID settings. 2. Check PID settings against Menu Default settings in the App the current readings then reset t hem to the default values.						
3. Faulty	ty UNITS > G-10-5272						
4. Unit in	click on the 'T	tus overview of <b>Unit # G-10</b> echnical Data' button at the	e right. To ad				
5. Unit se Switch se	service perfor	rmed, click on the green link	s below.				
( Duatan	Site:		Model:	Benchmark 200	00	Add New Start-up For	
6. Systen units can		/	Sales Order:	13080750-1 2013-08-27		Disable Faults for 24	
units can	Plant: Unit Serial #:		Ship Date: Local Rep:	2013-08-27 GA Fleet		Maintenance/Service Extended Period Shut	
_							
Ever		BOILER EFFICIE	ICY			0 <sub>2</sub> M	IONITORING (№
Possible	• >88%					• ±2%	

SSSIDE 9 89% 9 99% 9 99% 9 99% 9 99% 9 99% 9 99% 9 99% 9 99% 9 99% 9 99% 9 98% 9 98% 9 98% 9 98% 9 98% 9 98% 9 0 days | 6 months | 1year CYCLES PER HOUR 9 0.3 9 0.5 1 0 fb/m 5 .0/br 0 mAER Alert 1 0 fb/m 9 0 fb/m 1 0 fb Benchmark boilers provide maximum efficiency and 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 36" doorways 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.

### 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 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.

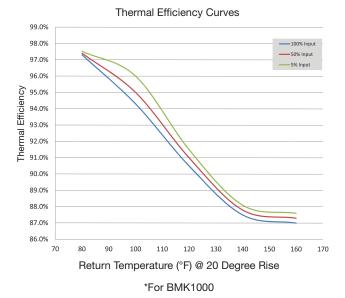
### Boiler Sequencing Technology (BST) – Load Sharing Strategy Maximizes Energy Efficiency

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. 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.

### 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.

### High Efficiency, Increased Energy Savings



## State-of-the-Art Technology and Features

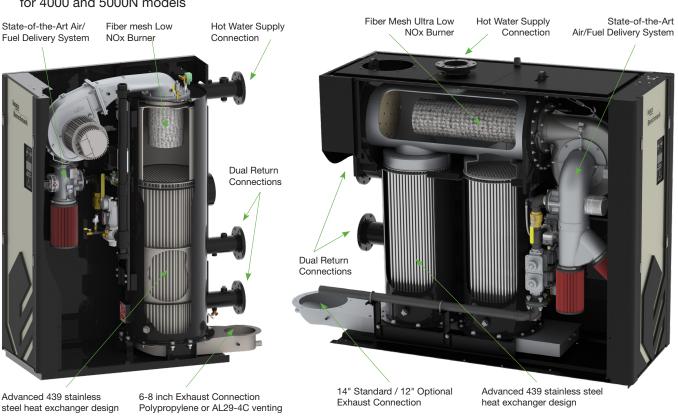
The Greenspec<sup>®</sup> Listed Benchmark boilers are perfect for "green" designs. Their small footprint, flexible venting/ piping options, high efficiency and lower operating costs can help facilities earn LEED points. Benchmark<sup>®</sup> has been designed with several environmental advantages.

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

- 15:1 20.1 turndown
- AERtrim (optional)
- Dual Return connections (optional)
- 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

### 5000, 6000

- 12:1 15:1 turndown
- AERtrim (optional)
- Dual Return connections (optional)
- 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 14" 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)



\*BMK 750-2000, 4000/5000N only \*\*BMK 750/1000 only

## Save Big with Installation Advantages

### Smallest Footprint in the Industry!

Benchmark has the smallest footprint in the industry! Its 6000 model is the most compactly designed 6 million BTU/hr boiler in the market – up to a third the size of the competition. All units easily fit through a standard doorway and can be transported via a freight elevator which translates into big savings on installation. All units are delivered as a single, fully assembled unit. Its quiet operation along with its doorway-sized, small footprint makes it ideal for both new construction and retrofit applications.

### 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 are all available and provide broad installation flexibility and savings.

Take for example the Benchmark 6000. Due to its high efficiency and low flue gas temperatures, the Benchmark 6000 can be installed with 12" flue venting – no other 6000 MBH 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.

Zero Side Clearance for Easy Maintenance

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.



BMK 3000

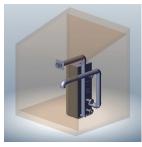


Outdoor solution available

### Vent Configurations



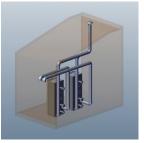
Vertical vent/room air



Direct-vent



Common vertical vent/room air



Common vertical vent/ individual sidewall air

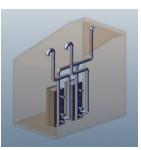
Consult an AERCO representative for additional venting configuration inquiries.



Sidewall vent/room air



Vertical vent/sidewall air



Common vertical vent/ individual vertical air



Individual sidewall vent/ common sidewall air

### Accessories



### **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.



### 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 6", 8", and 14" exhaust mufflers that are specifically designed with flanged ends to fit directly on the exhaust manifold of Benchmark boilers. The flangedend 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		50°F to 190°F				
Ambient Temperature			0°F to 130°F			
Accuracy			+/-4°F			
Thermal Efficiency (80° - 180°F)	95.6%	96.8%	94.6%	93.5%		
Input (Nat. Gas)	750,000 BTUH	1,000,000 BTUH	1,500,000 BTUH	2,000,000 BTUH	2,500,000 BTUH	
Net Output (Nat. Gas)	697,000 BTUH	930,000 BTUH	1,395,000 BTUH	1,860,000 BTUH	2,325,000 BTUH	
Turndown Ratio	15:1		20:1	• •	15:1	
Flue Connection Dia		6" Diameter		8" Dia	ameter	
Flue Material (per local code)	PVC, CPVC, F	PP or AL29-4C	AL29-4C, PP	PP or AL29-4C		
Water Inlet and Outlet	3" 150‡	3" 150# Flange 4" 150# Flange				
Dual Rear Returns			$\checkmark$			
Gas Connection	1" NP	T Male		2" NPT Male		
Gas Pressure Requirements*		14" WC Max	imum, 4" WC Minimun	n at Full Load		
Min/Max Water Flow	12-17	5 GPM		25-250 GPM		
Condensate Connection	3/4" NP	T Female		1.5" Tube		
Max Condensate Flow	6 GPH	8 GPH	9 GPH	10 GPH	17 GPH	
Pressure Rating			160 PSIG at 210°F		·	
NOx Emissions Cert.		SCAQM	D, TCEQ		BAAQMD, TCEQ	
Standard Listing and Approvals			UL, CUL, ASME			
Gas Train Options	FM Compliant, FM	Compliant with Valve	proving, Factory Install	ed, Double Block and	Bleed (Formerly IRI)	
Electrical Requirements	120/1/60 20 AMP (13 AMP FLA)		120/1/60 20 AMP (16 AMP FLA) 120/1/60 20 AMP (16 AMP FLA) 460/3/60 15 AI (5 AMP FLA)			
Water Pressure Drop	3.0 PSIG	@100 GPM	3.0 PSIG (	@170 GPM	3.2 PSIG @ 250 GPM	
Water Volume	28 gallons	26 gallons	44 gallons	40 gallons	60 gallons	
Weight, Installed (dry)	669 lbs.	700 lbs.	1,406 lbs.	1,500 lbs.	2,000 lbs.	

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

Model	Width	Depth	Height	
Benchmark 750	28"	23.5"	78"	Bench
Benchmark 1000	28"	24"	78"	Bench
Benchmark 1500	28"	42.6"	78"	Bench
Benchmark 2000	28"	42.6"	78"	Bench
Benchmark 2500	28"	55"	78"	Bench

Model	Width	Depth	Height
Benchmark 3000	28"	55"	78"
Benchmark 4000	34"	62.5"	78.2"
Benchmark 5000N	34"	62.5"	78.2"
Benchmark 5000	35"	88.3"	79.8"
Benchmark 6000	35"	88.3"	79.8"

Please find complete dimensions on the Benchmark tech data sheet.

# **Specifications and Dimensions**

	3000	4000	5000N	5000	6000	
Adjustable Temp Control		I	50°F to 190°F		l	
Ambient Temperature			0°F to 130°F			
Accuracy			+/-4°F			
Thermal Efficiency (80° - 180°F)	94.6%	94.1%	93.8%	93.9%	94.5%	
Input (Nat. Gas)	3,000,000 BTUH	4,000,000 BTUH	4,990,000 BTUH	5,000,000 BTUH	6,000,000 BTUH	
Net Output (Nat. Gas)	2,790,000 BTUH	3,720,000 BTUH	4,640,000 BTUH	4,650,000 BTUH	5,580,000 BTUH	
Turndown Ratio	15:1	15:1	20:1	12:1	15:1	
Flue Connection Dia	8" Diameter	12" Flue/ 1	0" Air Intake	14 Inch Optional / 12 Inch Flue Venting	14 Inch Optional / 12 Inch Flue Venting	
Flue Material (per local code)	PP or AL29-4C	PP or A	AL29-4C	PP or AL29-4C	PP or AL29-4C	
Water Inlet and Outlet	4" 150# Flange	6" 150‡	# Flange	6" 150# Flange	6" 150# Flange	
Dual Rear Returns			$\checkmark$			
Gas Connection	2" NPT Male	3" NP	T Male	2" NPT Male / 3" NPT Male*		
Gas Pressure Requirements*	14" WC Max	14" WC Maximum, 4" WC Minimum at Full Load			WC to 10" WC*	
Min/Max Water Flow	25-350 GPM	35-50	0 GPM	75-600 GPM		
Condensate Connection	1.5" Tube		1.5'	' Tube		
Max Condensate Flow	20 GPH	30 0	GPH	40 GPH		
Pressure Rating		160 PSIG at 210°F		80 PSIG at 210°F /	150 PSIG at 210°F	
NOx Emissions Cert.		BAAQMD, TCEQ		SCAQMD, TCEQ	SCAQMD, TCEQ, BAAQMD	
Standard Listing and Approvals	UL, CUL, ASME					
Gas Train Options		nt, FM Compliant with ۱ I, Double Block and Ble		FM Compliant 14" - 2PSI, FM Compliant 14" - 2PSI with Valv Proving System (VPS), FM Complian - 10", FM Compliant 4" - 10" with Va Proving System (VPS)		
Electrical Requirements	208/3/60 20 AMP (10 AMP FLA) 460/3/60 15 AMP (5 AMP FLA)		IP (12 AMP FLA) IP (23 AMP FLA)	208/3/60 30 AMP (19 AMP FLA) 460/3/60 20 AMP (9 AMP FLA) 575/3/60 20 AMP (7 AMP FLA)		
Water Pressure Drop	3.2 PSIG @ 250 GPM	3.0 PSIG @	@ 475 GPM	4.0 PSIG @	2 500 GPM	
Water Volume	55 gallons	77 g	allons	110 g	allons	
Weight, Installed (dry)	2,170 lbs.	2,20	0 lbs.	3,00	0 lbs.	

\*For Benchmark 5000/6000 offers an optional model for low gas pressure.









**Heating and Hot Water Solutions** 

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