



# Innovation

Commercial Tankless Water Heaters

# Hot Water on Demand without the Tank

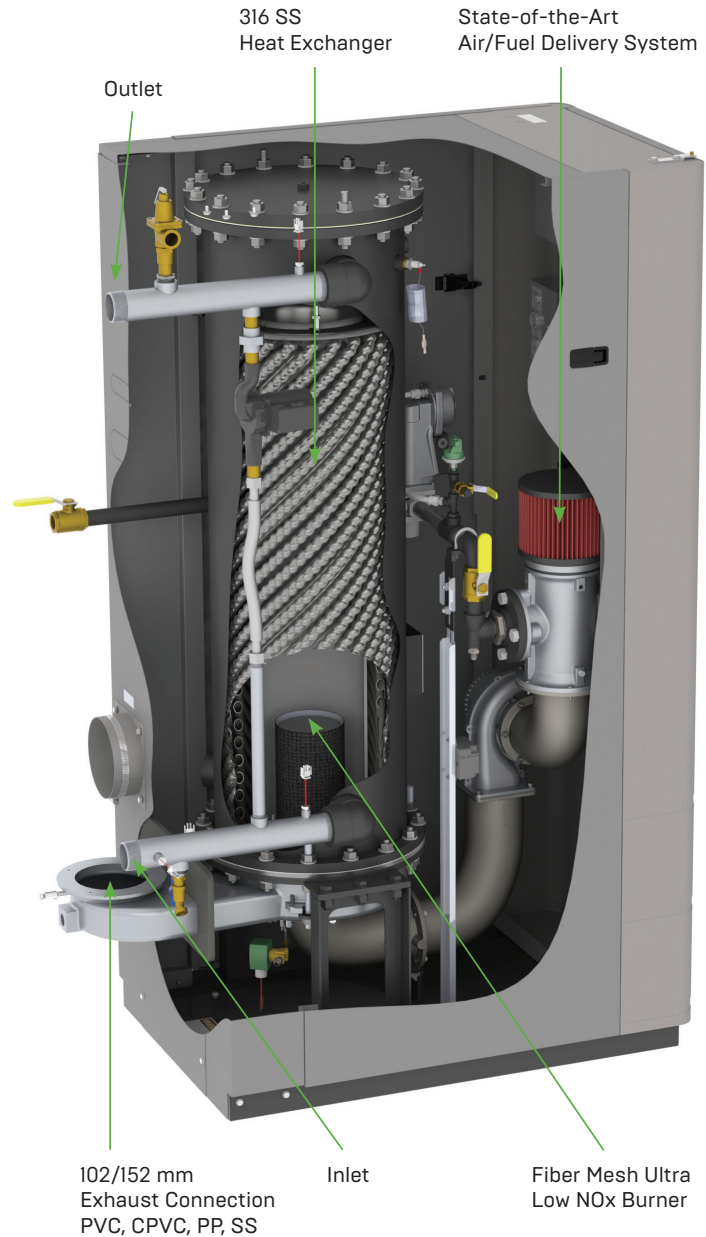
AERCO's Innovation is the only commercial-size tankless water heater that provides hot water on demand without the need for any storage. Unlike typical tank heaters that heat up standing water only to mix it down, the Innovation doesn't need significant storage volume to buffer load change and provide stable hot water temperatures. Due to its unique tankless design, the Innovation has the smallest footprint of any commercial size application. Not only does it save a tremendous amount of space with its compact footprint, it's also easy to install, simple to service, and cost effective (eliminating the need for expensive storage tanks, mixing valves and tank circulators).

## Key Features and Benefits

- 3x warranty protection vs. the competition
- Low operating, maintenance and installation costs
- 96-99% efficiency with set points of 48.9°C or below
- Long-lasting and highly reliable stainless steel helical firetube heat exchanger is thermal shockproof and scale resistant
- Compact footprint creates more available space
- Easy installation and venting versatility; direct/conventional venting with PVC, CPVC, Polypropylene or AL29-4C materials
- Precise temperature control  $\pm 2.2^{\circ}\text{C}$  due to dynamic feed-forward sensing and unmatched turndown (up to 30:1)
- Low NOx and low CO emissions
- 1/3 the standby losses compared to conventional tank-type heaters
- Able to daisy-chain multiple units for applications over 293 kW
- Eliminates need for mixing valves, tank circulators, storage tanks
- Available sizes: 176, 234, 311, 396 kW

## State-of-the-Art Technology

Innovation water heaters utilize state-of-the-art technology to easily meet highly diverse, demanding commercial and industrial hot water requirements in a compact and reliable condensing design. Its durable, high-efficient, helical wound firetube heat exchanger is time-tested to be impervious to thermal stress for an extended life. Enhanced waterside flow distribution maintains constant minimum velocities above 4 ft/sec across the heat exchanger. This keeps solids in suspension and greatly reduces scale dropout to maintain high efficiency and long life. The all stainless steel construction maximizes longevity in the condensing application and won't need fireside cleaning. The corrugated tubes increase effective heat transfer surface area for optimal thermal efficiencies up to 99%.



# The Benefits of Tankless Water Heaters

Tankless water heating systems help deliver the best possible ROI compared to their typical storage tank counterparts. Not only do they lower costs on installation and operation, but they save a tremendous amount of space for the facility (due to the elimination of big, cumbersome storage tanks and ability to use common venting), provide a safer environment for customers, and outlive tanked competitors by 10-15 years.

## Lower Installation, Maintenance and Operational Costs

Venting is one of the most expensive installation items. AERCO's Innovation not only allows for common venting with different sized units, but also in combination with its Benchmark boilers. This can significantly reduce the number of vent runs and wall/roof penetrations, which in turn lowers overall installation costs. Costs are lowered further because there's no need to purchase expensive storage tanks, circulators, and mixing valves. Operational costs are similarly decreased due to high efficiency (typically 96-99%), high turndown and reduced standby losses (no storage tank). With no need for hot water storage, less fuel is burned thereby increasing energy savings.

## Space-Saving Design

The Innovation is delivered as a single, fully assembled unit. Its small, doorway-sized footprint and quiet operation make it ideal for both new construction and retrofit applications. The unit's compact size allows it to be easily moved in and out of a mechanical room whether it's located in a cramped basement or in the penthouse of a 25-story building, eliminating the costs of tearing down walls or hoisting via helicopter. More available room can be used to generate income instead of unnecessarily storing water.

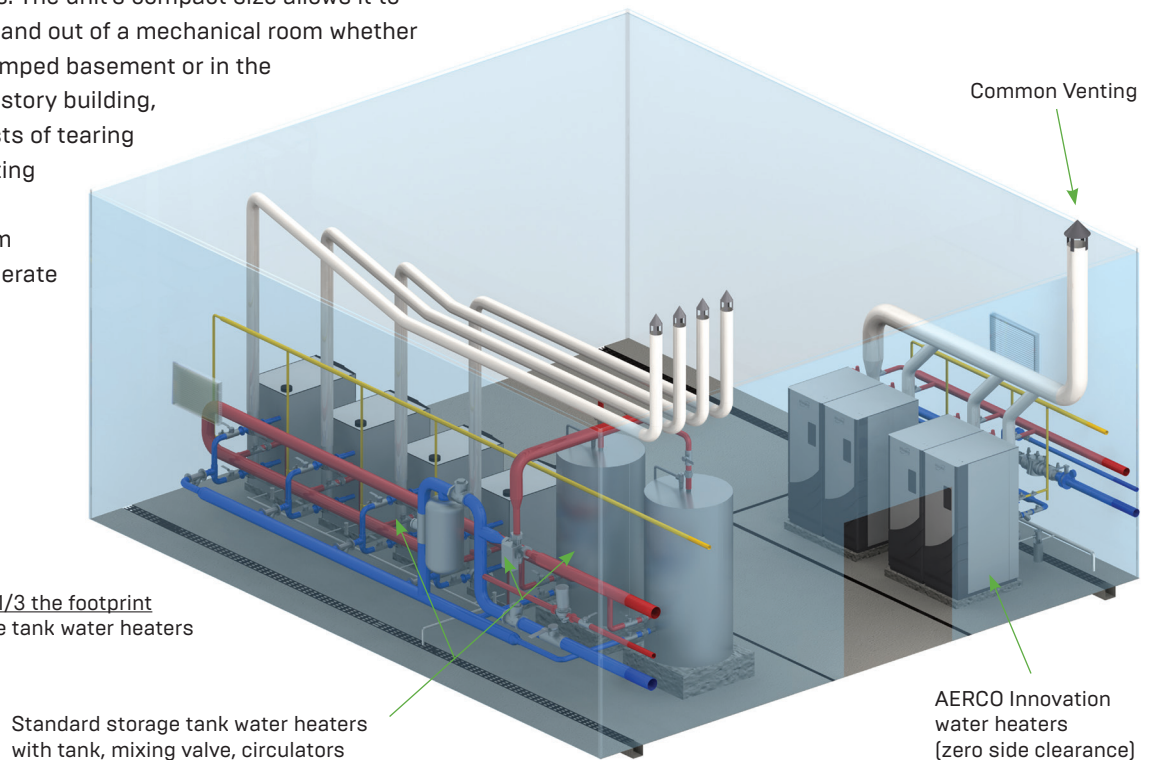
Four Innovations are 1/3 the footprint of four typical storage tank water heaters

## The Safer Water Heater

Stored water in a tank must be maintained at a hot temperature of 60°C in order to prevent Legionella bacteria, which means the water needs to be heated up only to be cooled down for consumption. However, the tankless design of the Innovation water heaters allows the system to operate with set point of 51°F – saving energy and reducing the risk of scalding while eliminating the need for costly mixing valves. Because water volume is kept to a minimum and continuous circulation is maintained through the Innovation, the risk of Legionella bacteria growth is virtually eliminated.

## Longer Life Cycle

With a life of more than 20 years, the Innovation lasts two to three times longer than a tanked heating system, which typically needs to be replaced every eight to 10 years because storage tanks are prone to rust, system failure and water damage.



# Advanced Design

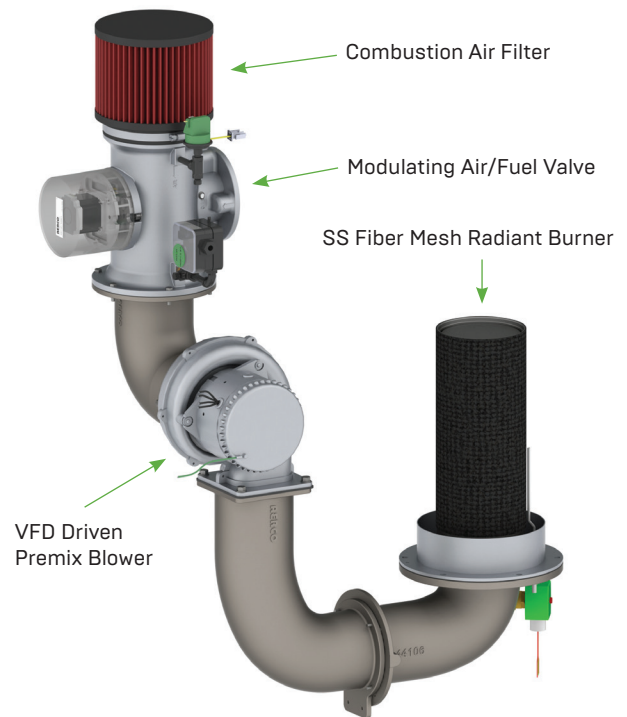
## Dynamic Load Anticipator

Further improving the efficiency of Innovation is AERCO's Dynamic Load Anticipator, an advanced control system that helps maintain precise modulation of the high turndown air/fuel delivery system. Field-proven for more than 60 years, dynamic feed-forward and feed-back sensors monitor inlet flow via the proportional change in mixed temperatures due to variations in the flow. The system's controls fire the unit to accurately match load requirements and produce tight  $\pm 2.2^{\circ}\text{C}$  outlet temperature control.



## High Turndown Air/Fuel Valve Delivery System

Innovation's high turndown air/fuel delivery system consists of AERCO's patented fully modulating air/fuel valve, VFD driven premix blower, and fiber mesh radiant burner. The system guarantees safe, stable, reliable and efficient combustion with the lowest NOx and CO emissions, as well as eliminates wasted fuel and reduces operating costs, making Innovation the smart choice for "green" designs.



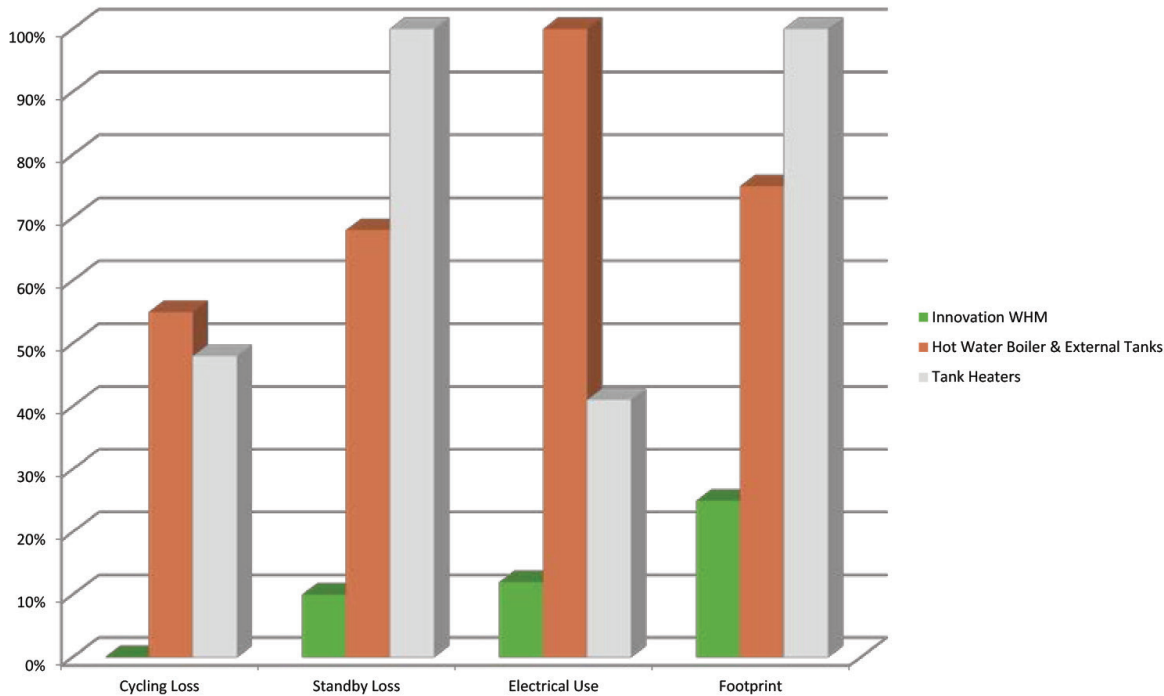
# C-More Control with Water Heater Management

AERCO's Innovation features the C-More Control System which combines temperature and operating controls, combustion safeguards and fault enunciator functions in a single, state-of-the-art controller. It ensures fail-safe heater operation if the external building controls fail.

Additionally AERCO's Water Heater Management system (WHM) comes standard on-board all C-More controls. WHM is designed to efficiently sequence up to eight water heaters on the same system to meet load requirements and ensure all water heaters in the system operate at maximum efficiency. It monitors the fire rate of all water heater sequences by opening or closing the motorized valve, as required, to meet hot water demand. It ensures an installed system of multiple Innovation water heaters:

- Optimizes operating efficiencies at all load conditions
- Virtually eliminates standby losses
- Increases system reliability through reduced cycling
- Accurately tracks daily domestic hot water demands

The result is the most energy-efficient and reliable water heating system design available. Only those units required to meet load are operating. Units in standby do not needlessly cycle to maintain set point – reducing system standby losses and unit wear to the bare minimum. Compared to a conventional storage system which requires 475 liters of storage for every 150 kW input, an Innovation system truly provides reliable domestic hot water on demand in the smallest possible energy footprint. All of which significantly reduces maintenance and operating costs, while increasing ROI.



# Sample Installations



Lodging

## **Convention Center Hotel San Diego, California**

When the north tower of this major convention center hotel was built in 1984, its 681 rooms and 25 floors got their hot water from two 880 kW copper fin water heaters and a massive 26,500 liters tank. After 15 years, the tank was severely leaking, replaced with two gas-fired 821 kW, 5,680 liters storage tank heaters. The retrofit required a crane to haul the oversized units to the 26th floor mechanical room. Within only a few years, the tank heat exchangers failed, and the hotel was forced to rely on its old copper fins. By 2012, both tanks were leaking, supplied by 30-year-old, 80% efficient heaters. The tower would soon be out of hot water. The hotel tasked an engineering firm and The Dawson Company to design its new system. They recommended six AERCO Innovation 311 kW fire-tube water heaters. The hotel now enjoys 96% efficiency, compared to 80% previously. And there's no need to store 11,360 liters anymore, thanks to the Innovations' tankless technology. The hotel recently hosted a large convention—putting the facility at peak occupancy. The OnAER system showed that no more than three units were required to handle the sustained peak load during the entire four days of the convention.



Healthcare

## **Hospital, Colorado**

This Colorado hospital's 16,260 m<sup>2</sup> facility, offers a wide range of expert pediatric care including urgent, outpatient specialty, inpatient and surgical, as well as the latest imaging and diagnostic technology. Instead of an old-fashioned, large, central steam plant, the hospital wanted an innovative, decentralized system to supply its state-of-the-art facility. Very few direct-fired tankless water heaters on the market are large enough to meet many hospitals' domestic water heating needs, but a head plumbing engineer on the project had used AERCO tankless water heaters for years. He chose to install five AERCO Innovation 1350s. With 97% efficiency, tankless design and onboard Water Heater Management (WHM) systems, Innovation 1350s were exactly what this hospital needed. The Innovation 1350s are ready to meet the high load diversity and critical capacity requirements of this new flagship hospital—which expects to treat some 80,000 patient in its first year.



Education

## **School District, Denver, Colorado**

The school district, located in Denver, CO, metro area, operates 61 schools with more than 50,000 students. One of the district's middle schools relied on an out-of-date storage tank-style water heater that suddenly failed, leaving the school without hot water. Since class was in session, the district needed to replace the unit immediately. The district's Plumbing Department was familiar with AERCO's products, having used the Benchmark series for several years in of its other facilities. They were knowledgeable of and impressed by the Innovation series water heaters and were interested in using them. The department contacted Taft Engineering to ask if an Innovation could solve its critical, no-hot-water problem. Taft's experts recommended the Innovation 600. The district's Plumbing Department was able to pick up and install the Innovation 600 unit within 24 hours. Taft dispatched a technician immediately to train the school's maintenance personnel in the Innovation's use, and they were up to speed within hours. What's more, in a time of ever-tightening school budgets, the district replaced a decade-old unit with one that's tankless, highly reliable and extremely efficient.

# Sample Installations



Multifamily Housing

## High Rise Apartment Building, New York City

This new, 12-story luxury rental residential building overlooks midtown Manhattan. The distinctive rental 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. However, the current plans for the building called for three 733 kWh water-tube boilers to provide supplemental heating for the loop, along with two 454 liters 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. AERCO fire-tube condensing water heaters and boilers didn't have the limitations of the current specified water-tube system. Three Innovation 1060s along with three Benchmarks were installed at the heating plant. This luxury high rise now utilizes a much more energy and space efficient system, with substantially lower installation costs and electrical operating requirements.



Sports Arena

## Professional Hockey Arena, New York

This professional hockey arena had a serious hot water problem. The facility's system—two copper fin heaters rated for 600 kWh, 81% efficiency, and feeding a 5,678 liters storage tank—was simply not up to the job. The heaters fell completely short during peak times in the arena... most often, 20 minutes before a game, when concession stands were preparing food, and 20 minutes after the game, when stands were cleaning up and players were showering. The arena asked R.P. Fedder Corp. to evaluate its replacement options. Its new owner was investing \$7 million in the facility, with a portion of that budget allocated to upgrade the hot water heaters. The client had a simple goal: Never run out of hot water again. R.P. Fedder recommended six AERCO Innovation 1060s. The Innovation 1060s delivered the perfect combination of performance and economy—96% efficiency, tankless design, a small footprint, zero-side clearance installation and flexible venting. The project was on budget and installed easily. And with more than enough hot water for everyone, every time, there hasn't been a single complaint since.



Government

## Governor's Mansion

The Governor's Mansion is a three floor, 30-room, Greek Revival-style home built in 1967. The space and domestic water heating were provided by a combination system consisting of a two natural gas-fired steam boilers that fed heat exchangers for space heating, a swimming pool, and a U-tube heat exchanger inside a 1,893 liters storage tank for domestic water heating. While one centralized steam system was meeting all the building's needs, it was not efficient. The plant had to operate continuously to meet domestic hot water needs rather than shut down when the heating season ended. Due to cycling and steam distribution piping losses, leaking steam traps and more, the steam boiler operated at a meager 50-60% efficiency. The engineering firm, hired to upgrade the building's heating system, recommended decentralizing the domestic hot water from the space heating system to reduce natural gas consumption. They also recommended the tankless, 96% efficient AERCO Innovation 1060 condensing gas-fired water heater for the installation. The improvement in building operating efficiency was evident within the first month of operation—when the mansion's July gas bill was a mere 15% of what it had been the previous July.

# Environmental Stewards



High efficiency Innovation water heaters are perfect for green building designs satisfying stringent requirements associated with environmentally-conscious facilities, and helping to facilitate LEED certifications.

## **Designed for Green Building (LEED credits)**

- Site Development (maximize open space): compact footprint with flexible venting
- Water Efficient Landscaping: condensate can be recovered (neutralization required) and used for irrigation or other gray water applications
- Optimize Energy Performance: maximizes operating efficiency through Water Heater Management system and high turndown (virtually eliminating standby losses)
- Low Emitting Materials (Adhesives and Sealants): incorporates Green Seal Standard GS-36 and Green Guard® compliant, Volatile Organic Compounds
- Low Emitting Materials (Paints and Coatings): uses corrosion and oxidation preventing paints, Green Seal Standard GS-03 compliant, Volatile Organic Compounds
- Indoor Chemical and Pollutant Source Control: sealed combustion capability eliminates the need for louvers or damper systems that can potentially bring chemicals or pollutants from outside
- Innovation in Design: tankless, compact footprint and industry-leading turndown minimize cycling

## **Reduced Energy Consumption**

The Innovation is constantly condensing (heating cold inlet water vs recovering hot water from a storage tank) and uses less electrical power (no circulator pumps are required).

## **Premixed, SS Fiber Mesh Burners**

High-efficiency combustion and low pollutant levels of less than 20 ppm NO<sub>x</sub>.

## **Low Vent Temperature**

Modest venting temperatures allow units to be common vented using eco-friendly PolyPro material.



# Smart Size Program with AERCO Guarantee

## AERCO Smart Size Water Heater Sizing Program

Smart Size is an easy to use, comprehensive tool that ensures you'll select the best-sized water heater for your project. AERCO developed this program using 60+ years of experience and empirical data from sizing and selecting tankless domestic water heaters across a variety of commercial building applications.

Smart Size generates a much more realistic and financially viable selection proven to satisfy the specified load of your project without the excessive oversizing prevalent with most industry-standard sizing methods. By not oversizing your water heater, you'll save energy, optimize your system and increase ROI.

Best of all, AERCO guarantees its selection will satisfy the building design load provided the real design conditions and accurate fixture count have been entered to generate the sizing. The guarantee covers material and labor charges necessary to correct the system capacity issue. AERCO is the only manufacturer to provide such a guarantee.

The intuitive program gives you a high degree of flexibility during the sizing and selection process allowing you to:

- Size a single system using building fixture count and AERCO sizing method or input GPM
- Size a single system with multiple applications (e.g., a hotel with a restaurant)
- Size multiple systems (or zones) within a single building
- Size multiple systems (or zones) within a single building, with multiple applications
- Incorporate storage tanks into the design
- Calculate and incorporate the stored water volume within the piping
- Size a hydronic buffer tank if required (SmartPlate only)
- Add various redundant capacities

Every sizing will generate a PDF of the selection report for print or download. You can access Smart Size at [www.AERCOsmartSizing.com](http://www.AERCOsmartSizing.com).

# Venting and Installation Advantages

To ensure AERCO products operate as well as they are designed, it's vital they are paired with strong, high-quality venting that can match the Innovation's durability and longevity. That's why AERCO has partnered with two leaders in the industry, DuraVent and Security Chimneys, to offer you superior venting alongside our trusted equipment, providing you with complete engineered systems for all your projects:

- Security Chimneys International SS and SSD/SSID venting systems are made from AL29-4C® super-ferritic stainless steel. The single- and double-wall SS and SSD/SSID install effortlessly, are highly reliable and meet industry specifications.
- DuraVent PolyPro® polypropylene vent pipe is for ANSI Category II and IV gas-burning appliances. The PolyPro vent system is suitable for exhaust temperatures up to 230°F/110°C and a maximum positive pressure of 3.7 kPa without the toxic risk associated with other plastic materials.

**AERCO guarantees the vented appliances will operate within the optimal outlet pressure range throughout the firing cycle if the venting is purchased through us.**

## Venting Versatility

The Innovation provides a number of venting options including sidewall, through-the-roof, and sealed combustion capabilities (direct-vent). It's also approved for venting with PVC, CPVC, Polypropylene, or AL29-4C materials, which provide broad installation flexibility and increased savings.

## Engineering support

Customers can also leverage the vast experience of AERCO engineers who have devoted their careers to developing cost- and space-saving solutions. Standard services available include:

- Engineering — AERCO engineers work with manufacturers to verify vent sizing/design for enhanced reliability
- AutoCAD drawings
- Submittal information
- Customer service

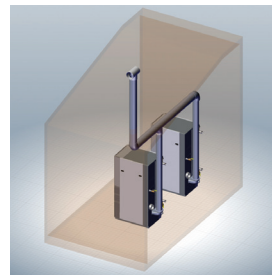


SS and SSD/SSID Venting Systems

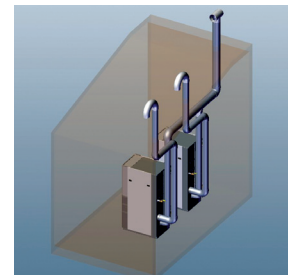


DuraVent PolyPro®

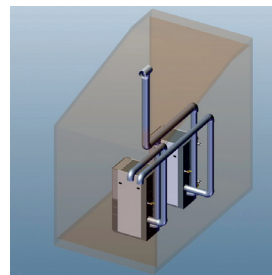
## Vent Configurations



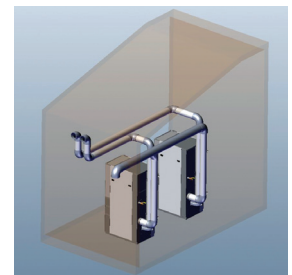
Common vertical vent/  
room air



Common vertical vent/  
individual vertical air



Common vertical vent/  
individual sidewall air



Individual sidewall vent/  
common sidewall air

# Specifications and Dimensions

	INN 600	INN 800	INN 1060	INN 1350
Adjustable Temperature Control	10°C to 88°C	10°C to 88°C	10°C to 88°C	10°C to 88°C
Ambient Temperature	-18°C to 54°C	-18°C to 54°C	-18°C to 54°C	-18°C to 54°C
Accuracy	+/-2.2°C	+/-2.2°C	+/-2.2°C	+/-2.2°C
Input (kW)	176	234	311	396
Net Output (kW)	169	226	300	381
Turndown Ratio	up to 14:1	up to 18:1	up to 21:1	up to 22:1
Flue and Air Intake Diameter	101.6 mm	152.4 mm	152.4 mm	152.4 mm
Flue Material (per local code)	PVC, CPVC, PP or AL29-4C	PVC, CPVC, PP or AL29-4C	PVC, CPVC, PP or AL29-4C	PVC, CPVC, PP or AL29-4C
Water Inlet & Outlet	2" MNPT (50.8 mm NPT Male)	2" MNPT (50.8 mm NPT Male)	2" MNPT (50.8 mm NPT Male)	2" MNPT (50.8 mm NPT Male)
Gas Connection - Natural Gas	1" MNPT (25.4 mm NPT Male)	1" MNPT (25.4 mm NPT Male)	1" MNPT (25.4 mm NPT Male)	1" MNPT (25.4 mm NPT Male)
Gas Connection - Propane	1/2" NPT Male (12.7 mm NPT Male)	1/2" NPT Male (12.7 mm NPT Male)	3/4" NPT Male (19.05 mm NPT Male)	3/4" NPT Male (19.05 mm NPT Male)
Gas Pressure Requirements (Nat. Gas)	Minimum 10.0 mbar (1.0 kPa) @ Full Load	Minimum 10.0 mbar (1.0 kPa) @ Full Load	Minimum 10.0 mbar (1.0 kPa) @ Full Load	Minimum 10.0 mbar (1.0 kPa) @ Full Load
Gas Pressure Requirements (Propane)	Minimum 14.9 mbar (1.5 kPa) @ Full Load	Minimum 14.9 mbar (1.5 kPa) @ Full Load	Minimum 14.9 mbar (1.5 kPa) @ Full Load	Minimum 14.9 mbar (1.5 kPa) @ Full Load
Maximum Continuous Water Flow	3.15 LPS	3.15 LPS	3.15 LPS	3.15 LPS
Condensate Connection	3/4" FNPT (19.05 mm NPT Female)	3/4" FNPT (19.05 mm NPT Female)	3/4" FNPT (19.05 mm NPT Female)	3/4" FNPT (19.05 mm NPT Female)
Maximum Condensate Flow	17 LPH	23 LPH	30 LPH	42 LPH
Pressure Rating	11 bar (1100 kPa) @ 99°C	11 bar (1100 kPa) @ 99°C	11 bar (1100 kPa) @ 99°C	11 bar (1100 kPa) @ 99°C
NOx Emissions Certifications	SCAQMD, TCEQ	SCAQMD, TCEQ	SCAQMD, TCEQ	SCAQMD, TCEQ
Standard Listing & Approvals	UL, CUL, ASME (HLW)	UL, CUL, ASME (HLW)	UL, CUL, ASME (HLW)	UL, CUL, ASME (HLW)
Gas Train Options	FM Compliant or Factory Installed, Double Block and Bleed	FM Compliant or Factory Installed, Double Block and Bleed	FM Compliant or Factory Installed, Double Block and Bleed	FM Compliant or Factory Installed, Double Block and Bleed
Electrical Requirements	220 VAC, Single Phase, 50/60 Hz - 15A Breaker (8 FLA)	220 VAC, Single Phase, 50/60 Hz - 15A Breaker (8 FLA)	220 VAC, Single Phase, 50/60 Hz - 15A Breaker (8 FLA)	220 VAC, Single Phase, 50/60 Hz - 15A Breaker (8 FLA)
Water Pressure Drop @ 0.95 LPS	86.2 mbar (8.6 kPa)	86.2 mbar (8.6 kPa)	86.2 mbar (8.6 kPa)	86.2 mbar (8.6 kPa)
Water Pressure Drop @ 1.89 LPS	137.9 mbar (13.8 kPa)	137.9 mbar (13.8 kPa)	137.9 mbar (13.8 kPa)	137.9 mbar (13.8 kPa)
Water Volume (Liters)	95.8	95.8	83.3	75.3
Weight, Installed (kg)	445 (dry), 545 (wet)	445 (dry), 545 (wet)	454 (dry), 540 (wet)	476 (dry), 554 (wet)
Weight, Shipping (kg)	490	490	483	506

## Dimensions

Innovation	Depth	Width	Height
600/ 800/ 1060/ 1350	129.54 cm	71.12 cm	193.04 cm



U.S. Patent No.: 9,243,848



Heat | Hot Water | Energy Recovery  
Solutions

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