Water heater specifications

Specifying a new water heater need not be a bridge over troubled waters. There are many considerations when selecting a commercial water heater.

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Just a few years ago, specifying engineers routinely were challenged by an inability to easily place and locate commercial water heaters. The limitations of atmospherically vented systems, facility design, aesthetics, and close proximity to other buildings all factored in to the equation.

Today it's not uncommon for building owners or managers to express late in the game an aversion to visible venting, based purely on aesthetic reasons. This is especially true in historic districts.

Fortunately, many of the obstacles to easy placement of water heaters—at least those tied to building design and construction—are overcome with the emergence of new water heater systems, making it much easier to achieve manufacturer-specified combustion air or venting runs.

During installation of high-efficiency systems for a New Jersey hotel, a temperature gauge is being applied to a water heater's hot water outlet. *All photos: Bradford White*

The arsenal of commercial water heater products and associated technology has grown considerably, availing a wide range of fuel, venting, and combustion air options. There also are many new application-friendly components and techniques to enable trouble-free specification and installation, though—with the new green systems—a few special needs emerge.

High-efficiency, condensing systems are great for end-users in terms of energy consumed, chiefly because they harvest heat from waste condensate. The energy advantage requires modest design and installation changes to meet the need for condensate treatment and drainage. This may translate to an inability to use existing venting if the original water heater was vented atmospherically, and the availability of electricity. Some systems require hard-wiring; other commercial systems need only a simple wall plug-in.

Condensate drainage is a likely necessity. Often, drained fluids are too acidic for metal drain lines. Routing the condensate through a simple, lime-bed acid neutralizer may solve the problem easily. Better yet, CPVC or PVC drain lines can handle the acidity. Condensate typically has a pH of 4.0, about that of Coca-Cola—just enough to attack any metal it connects with. Over time, the cumulative effect of exposure to acidic runoff threatens the integrity of the drain lines.

Venting

If new, high-efficiency water heaters are planned as a retrofit, existing, single-wall B-vents must be replaced in favor of PVC, CPVC, or ABS plastic. The majority of venting lines have a 3- or 4-in. diameter, precisely matched

The cold water supply is connected to a high-efficiency water heater's inlet tapping.

to the design requirements of new blower motor assemblies that discharge from the top of water heaters.

Plastic vent materials are inexpensive and easy to work with, and present no compromise in safety or performance. Some new water heater systems have the ability to vent through the roof and pull air in for combustion through the wall; this is a big advantage. The need to improve flexibility of installation and placement has driven the development of power, power direct vent, through-roof, and side-wall venting options.

Finally, if the application offers abundant atmospheric combustion air, some water heater models require only one pipe for venting.

Multistory and high-rise installations challenge traditional venting. High-efficiency water heaters frequently can accommodate long venting runs. Often, there's no need to run vertical venting all the way to the roof, requiring a roof penetration. Many systems now are just as well served with side-wall venting.

New codes are forcing all of us to be attentive to a broad range of emerging requirements. National, state, and local codes are changing in the wake of the green movement's more stringent environmental policies and initiatives. Among the applicable national codes is the need for water heater system more than 199,999 MBH to be American Society of Mechanical Engineers certified.

Historic settings are commonly guarded by restrictions that regulate the presence and appearance of modern building systems and attachments (i.e., wire, regulators, transformers, and venting). In fact, the presence of old and unsightly or loud venting systems has actually encouraged the replacement of aging atmospheric water heaters. |cse|

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New system shaves cost of operation

Chuck Appleby owns Old Lyme, Conn.-based Appleby Plumbing Co. Recently, he received an emergency replacement call from the owners of the 232-year-old Griswold Inn, founded in 1776 near the banks of the Connecticut River and nestled among many other old and beautifully preserved buildings.

The inn needed a substantial overhaul brought on by the sudden death of an 8-year-old, 500,000 Btu commercial water heater, the only source of domestic hot water for the Griswold Inn's award-winning kitchen.

"Of course, the old inn wasn't built to accommodate modern mechanical systems," said Appleby. He specified a new, 400 MBH, liquid propane-fired, high-efficiency water heater to replace the quickly deteriorating system. The water heater the inn's owners replaced had required a 12-in. stainless steel draft hood and chimney. "Too bad they had to spend that kind of money on a water heater with such a short life span," said Appleby. "The new system we installed requires only a simple, 4-in. PVC stack, and at 98% efficiency, would cost them a whole lot less to operate. The key advantage was the condensing unit's super-high recovery rate. Because we could heat so much more water, we were able to size it at 100,000 fewer Btus, a move that also had a huge impact in their fuel consumption."

Another attribute is that there are no stack losses because the new system is equipped with sealed combustion and uses both PVC exhaust and combustion air lines. The water heater also offered several venting options, electronic controls, four protective magnesium anode rods, a sediment reduction system, and factory-installed dielectric fittings.

Considering the sad waste of resources on the stainless steel stack, which Appleby left in place, he devised a plan that gave it new purpose. "We used it as an intake air ventilation duct to cool the restaurant's large refrigeration equipment," he said. "They had a growing problem there because the equipment had been running hot, and this was consuming electricity [highest, by far, of all energy sources in the state] at an alarming rate. Typically, the air around the refrigeration systems was 120 to 130 F, year-round. Using the 12-in. duct to bring fresh air in, we were able to get those temperatures down substantially.

"The biggest benefit of all was in the energy savings," said Appleby. "Today, no one can responsibly afford to waste energy."