



Small Packaged Boilers

Solve Many Problems

“Ponies” Turn Out to Be Real Workhorses



The Clayton 60 bhp vertical packaged boiler fits in a small space. Connect the feedwater, steam, exhaust and electric connections and it's ready to run.

Does this sound familiar? Your facility has a central boiler plant that supplies steam for many applications, including space heating, domestic hot water, laundry, kitchen or key manufacturing processes. Your boilers have capacity to meet all these requirements on the peak demand day of the year, plus a healthy reserve. But much of the year you are operating at just a small fraction of your capacity.

NEGATIVE ASPECTS OF LOW STEAM DEMAND

When your steam requirements are a small fraction of your boiler capacity, you may be keeping a large boiler hot, operating

far from its most efficient levels and decreasing the expected life of the boiler. Further, you may be carrying the additional expense of having an operator on duty in the boiler room around the clock to supply only a small or intermittent steam requirement. An engineering solution to this situation uses small packaged boilers, often designed for unattended operation.

For example, health-care facilities in the Northern U.S. and Canada normally have a large boiler plant. These supply steam and/or hot water for a variety of purposes, but the largest volume use is space heat in the winter months. A facility may have 1,000 or more boiler horsepower (bhp) available, but for six to eight months of the year the facility really only

needs less than 50 bhp. A large boiler is kept hot and runs at 20% of capacity or less. At these levels, the boiler may operate at only 65-70% efficiency.

WHEN PROCESS STEAM REQUIREMENTS ARE SEASONAL

In the food-processing industry, the need for large volumes of steam is often intermittent, but a large boiler loafs along at a tiny fraction of its capacity, and an operator stands by to meet code requirements, adding significant cost to the business.

The best solution for these situations may be to install a modern gas-fired packaged boiler sized for low volume steam requirements, and only fire up the large boilers when that capacity is actually needed. Small boilers are available in sizes from 5 to 300 bhp, and can produce steam at pressures that match up with other system designs. These installations, sometimes called “pony boilers” or “summer heating boilers,” take advantage of the very high efficiency and precise control of small packaged units.

COMPACT PACKAGED BOILERS

The “packaged” aspect of these boilers is complete, including digital control systems. Units are skid-mounted and require only electrical connection and piping out to supply water and steam lines from provided pipe stubs. Some owners have

AT A GLANCE

- Large boilers can be energy losers at low loads
- Seasonal or summer loads ideal target for small package systems
- Vertical boilers take minimal floor space
- Important to understand local codes and water conditions

For More Information

Clayton Industries
<http://www.claytonindustries.com>

Fulton Boiler
<http://www.fulton.com>

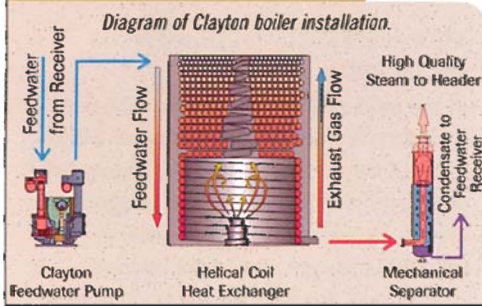
Hurst Boiler & Welding
<http://www.hurstboiler.com>

Miura Boiler
<http://www.miuraboiler.com>

resisted adding a pony boiler because of a perception of inadequate space in the boiler room for more equipment, but today's small package boilers are vertical designs, needing very little floor space and easily fit into an out-of-the-way corner.

If the packaged boiler is added to an existing steam system, local codes will require it to operate at the same pressure as the existing system. Manufacturers can supply systems that match up with existing pressures to levels as high as 1,000 psig. More commonly these systems operate at 150 to 250 psig.

How We Make Steam



PACKAGE INCLUDES FEEDWATER TREATMENT

One leader in packaged boiler technology is Clayton Industries, offering a range of vertical packaged boilers in sizes from 20 to 300 bhp. Clayton's boiler has a helically coiled watertube arrangement in a vertical configuration, and is available with integrally skid-mounted feedwater treatment equipment and system controls. Clayton builds package systems for a wide range of pressures and uses.

Eric Kessler, Eastern Region Sales Manager for Clayton, notes growing interest in using small units. "There are many attractions — the small footprint is one-third the size of conventional horizontal boilers. Our boiler can go from cold to steam in five or six minutes, and can follow building steam load patterns."

Another supplier of small packaged boilers is Miura Boiler, which builds a line of packaged low-pressure and high-pressure boilers in sizes ranging from 50 to 300 bhp. Miura emphasizes the value of this design for very low NO_x emissions, and to minimize hot spots and tube leaks that tend to be a problem with firetube designs.

Fulton Boiler Products has a family of tubeless vertical packaged boilers ranging in size from 4 to 150 bhp, in a wide range of pressures. The downward-firing configuration of the boiler allows a combustion air preheat feature that boosts total efficiencies as high as 85%.

CUSTOMER INTEREST IN PACKAGED SYSTEMS GROWING

According to John Ashby at Fulton, there is growing interest in these modular boilers for a wide range of applications, including health care facilities, schools and industrial plants. Fulton places emphasis on the long operating life of its equipment. Ashby notes that operating lives of 30+ years are not unusual. He indicates, "There is a growing interest in replacing large, older boilers with modular units that can be brought on line in stages to match the plant requirement."

According to Ashby, there is tremendous variation in local and state requirements for having an attendant on duty. In California, he says, the rule is that with high-pressure boilers of more than 10 bhp, an attendant is required. In other areas the rules may be 20, 50 or even 100 bhp as the criterion. "Boiler manufacturers are aware of these limitations and offer products in various sizes to meet local rules."

Another manufacturer of modular vertical packaged boilers is Hurst Boiler & Welding Company. Hurst representative Ray Pierce indicates that there is steady interest in replacing older, large boilers with packaged boilers installed in modules. He says, "The most important concerns we ask owners to be aware of is feedwater quality and appropriate pretreatment. That causes more problems than anything else."

LOCAL EXPERTISE IMPORTANT

Pierce also notes, "It is important that owners work with a local boiler sales specialist who is aware of local codes and conditions." He indicates that boiler plant owners tend to delay for years putting in packaged equipment because of perceived first costs. "But in many cases they could pay for the installation in just a few years of energy savings, and after that the payback is large."

Although small packaged boilers are commonly used as supplemental boilers, they are also important for applications where there was no steam supply, and changing operations made one necessary. This was the case at McLean Packaging of Pennsauken, New Jersey. Seven years ago, this firm purchased a new machine for corrugating paper for cardboard. The facility previously had no steam supply, but the new machine needed 185 psig steam. Working with Clayton Boiler, they determined that a 60 bhp packaged boiler would meet the requirement. The natural gas supplier for the facility is PSE&G.

Joe Adams at McLean indicates they were attracted by the packaged nature of the product, and the small footprint. "It has worked out well for us, and has been just the right size for this piece of machinery." He notes that his company took out a maintenance contract with Clayton, which does an annual inspection and overhaul as needed. "I'd recommend that to other owners, especially if reliability is important."

ENGINEERING ANALYSIS ESSENTIAL

All of the manufacturers emphasize the need for a good cost-benefit analysis, and a complete understanding of the present and future need for steam throughout the year. Owners also need to understand local boiler codes in order to specify the system that will provide optimum savings. With that information in hand, a significant reduction in operating costs can be achieved with today's modular packaged boilers. **(GT)**