MIURA

MI

MULTIPLE INSTALLATION SYSTEM

The New LX-300 Zero-Side-Clearance Steam Boiler Packs All The Horsepower You Need in 1/2 the Space (Model Shown: LX 300 SG)

on-demand performance + modular scalability for large applications

- Customize plant size to specific needs
- Automatically stage boilers to meet demand fluctuations
- Save 20% on average in annual fuel costs
- Provide equivalent boiler capacity in less than half the space
- Reduce CO_2 and NOx emissions
- Ideal for a wide range of applications from point-of-use to district energy

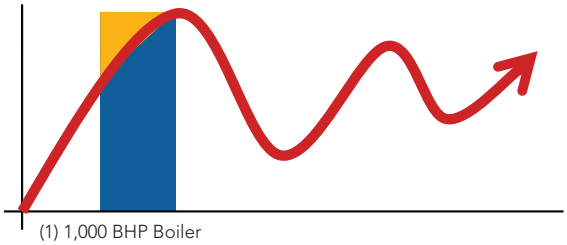
U.S. GREEN BUILDING COUNCIL MEMBER

On-Demand Steam Solutions

MI In Multiple Installations, modularity = enhanced energy management capability

utilize modularity to bring On-Demand steam performance to large scale applications

conventional system

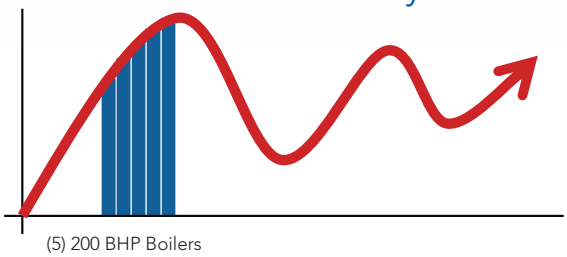


(1) 1,000 BHP Boiler

- Conventional boiler systems expend large amounts of energy to meet variable load conditions
- Design limitations of conventional boilers prevent them from efficiently responding to fluctuating load demands

Significant wasted energy & emissions at load swings

modular on-demand systems



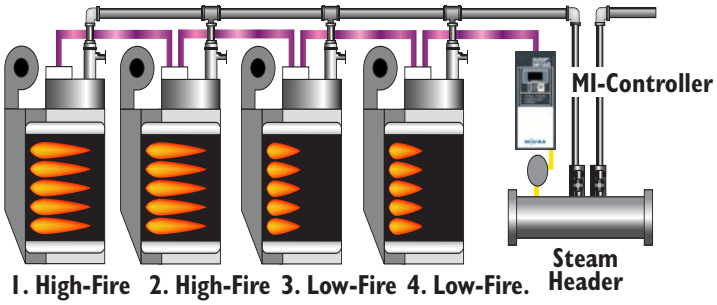
(5) 200 BHP Boilers

- Modular on-demand boiler systems reduce energy consumption required to meet variable loads by dividing the output capacity among multiple small units
- Modular systems are designed specifically to meet varying load demands

Significant reduced energy & emissions at load swings

how it works

Miura's MI System relies on a robust boiler control system consisting of the MP1 "master" controller and individual MT1 "slave" terminals at each modular boiler unit. The master controller monitors steam demand through a steam sensor at the header and utilizes sophisticated software to optimize the staging sequence of individual boilers for best overall system efficiency. The MI system software includes a variety of pre-set controls for load management of a diversity of applications with additional potential for customization of settings to precisely match site-specific requirements.

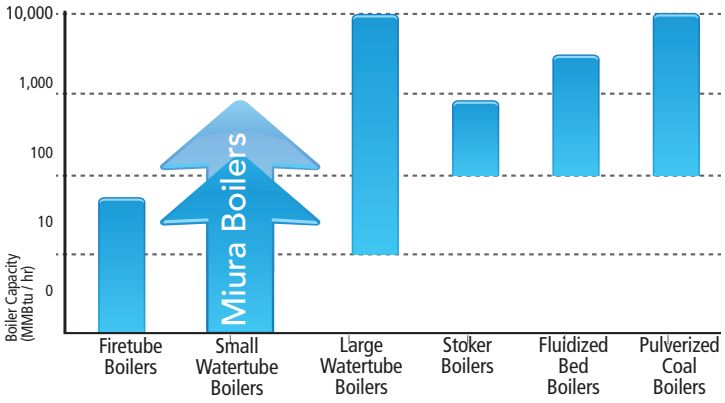


(MI Terminal at each boiler unit; see page 4 specs for more details)

flexibility + efficiency

Whether you're seeking to address small, point-of-use applications or larger centralized/district energy applications, a Multiple Installation of Miura boilers is the answer. A single MI master controller can handle up to fifteen linked modular boilers with outputs of up to 150 MMBtu/hr (4,500 BHP). For larger applications, several controllers can be linked together.

By utilizing multiple, linked master controllers, there's virtually no limit to the size of the application that can be accommodated by a modular array, and do so while optimized for the highest possible efficiency.



increasing efficiency = reducing losses

Based on current boiler efficiency metrics (or measuring thermal efficiency at 100% output), an example 12 MMBtu/hr conventional boiler is rated at 2% radiant losses, or 240,000 Btu/hr energy lost through the boiler shell. With significantly reduced water content and surface area, Miura's compact boiler units are rated at only 0.5% radiant losses, or minimizing losses to only 60,000 Btu/hr.

A typical 12 MMBtu/hr boiler is most likely operating at about 1/3 of its rated output. With a reduced operating load, radiant losses actually triple to 6% (proportionate with reduced input vs. rated shell losses) with the conventional boiler. In comparison, the compact modular example allows 2 out of the 3 units to be completely shut off, resulting in a total of only 0.5% radiant losses or 20,000 Btu/hr.

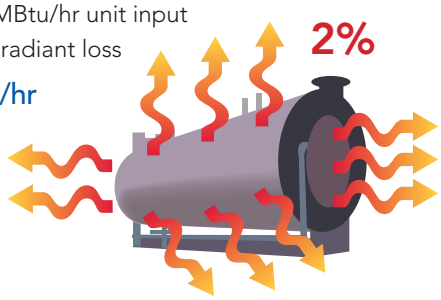
Thus, Miura's modular On-Demand boilers provide superior energy management capability by reverse-engineering its technology with actual boiler operating conditions in mind. The result: enhanced load-matching performance with increased efficiency and reduced environmental impact.

radiant losses: 12 MMBtu/hr input at **100%** output

► conventional system

- Single 12 MMBtu/hr unit input
- Rated at 2% radiant loss

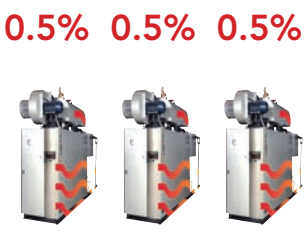
240,000 Btu/hr
energy loss



► modular on-demand systems

- 3 x 4 MMBtu/hr unit input
- Rated at 0.5% radiant loss

3 x 20,000 Btu/hr losses =
60,000 Btu/hr
energy loss

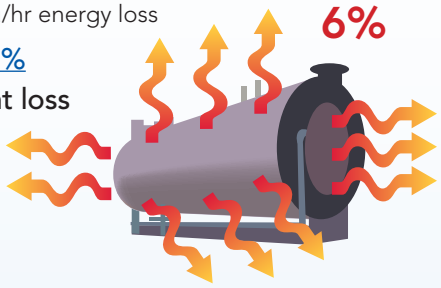


radiant losses: 12 MMBtu/hr input at **33%** output

► conventional system

- Single 12 MMBtu/hr unit at 33% =4 MMBtu/hr input
- 240,000 Btu/hr energy loss

Results in 6%
total radiant loss



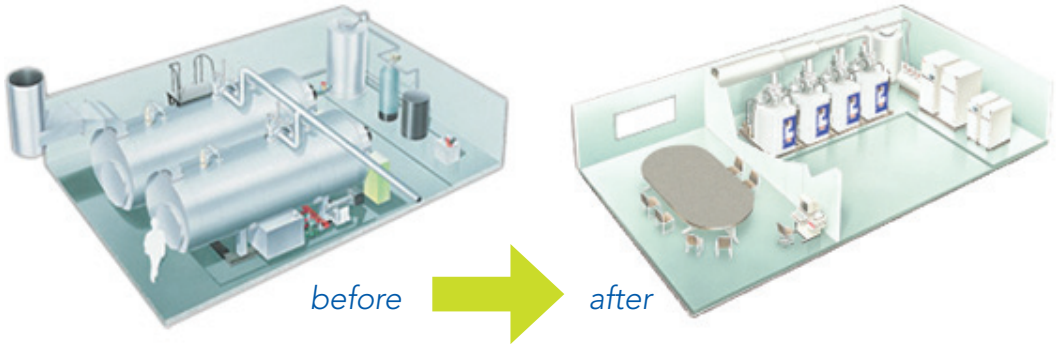
► modular on-demand systems

- 3 x 4 MMBtu/hr units (only 1 operating)
- 1 x 20,000 Btu/hr losses =20,000 Btu/hr energy loss

Only 0.5%
total radiant loss

compact footprint saves space and money

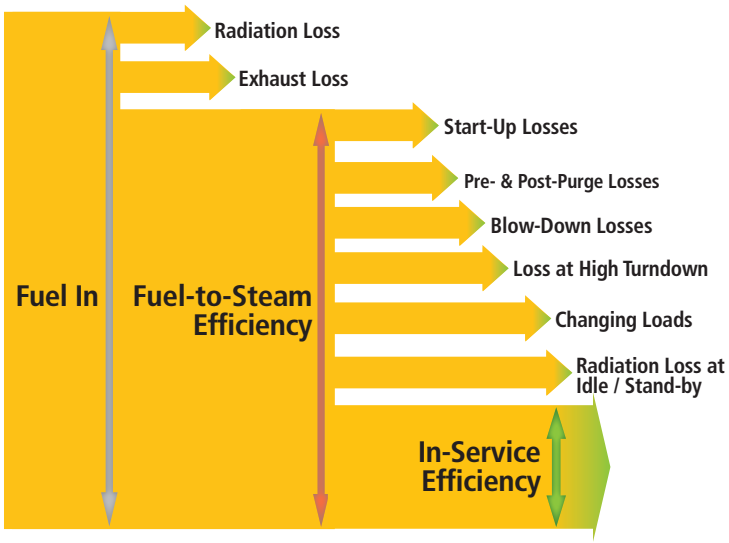
The compact footprint of Miura boilers offers great flexibility when designing a new or reconfiguring an existing boiler room. In addition to being half the size of a traditional boiler plant, Miura boilers eliminate tube pull-space and door-swing space requirements typical of conventional designs. This allows configuration of the boiler room for double the output of an existing boiler plant or reduction of its size by over fifty percent.



in-service efficiency – a more complete measure of boiler performance

When choosing a boiler, fuel cost savings are a primary consideration given that fuel costs represent over 90% of the system's total lifecycle costs. However, current boiler efficiency standards do not sufficiently account for all energy losses accumulated during a boiler's operating cycle to bridge the gap between "catalog efficiency" and actual fuel costs. Beyond simple Combustion Efficiency ("Fuel-In" Efficiency) and Thermal Efficiency ("Fuel-to-Steam" Efficiency), it is important to understand all of the remaining energy losses in the energy mass balance to have a clear understanding of a boiler's operating, or **In-Service Efficiency**.

Referring to the diagram on the right, you will notice that several additional operational losses contribute to a boiler's overall In-Service Efficiency. While it is typical to expect around 15% in boiler efficiency reductions associated with combined Fuel-In and Fuel-to-Steam losses, there is as much as an additional 20% in In-Service Efficiency reductions associated with accumulating operational losses including: start-up losses, pre- & post-purge losses, blow-down losses, loss at high turn-down, losses at changing loads & radiation losses at idle/ stand-by. When accounted for, these additional losses provide energy managers with the information needed to optimize their system's energy performance.



Miura's On-Demand boiler technology is engineered with the full spectrum of operating losses in mind with specific design features that address each to provide superior energy management capability and industry-leading In-Service Efficiency.

optimized energy management with integrated logic technology

► MI controller ("master")

The secret behind our industry-leading energy management system is the MI controller (MP1 200). This controller constantly monitors all the boilers in the system for performance and changes in demand. The controller automatically brings boilers on line, regulates outputs of other units, or switches off boilers as needed.

Voltage	AC 120V (+10%, -15%)
Frequency	50/60 Hz
Allowable Control Pressure	30-270 (Standard) psi 15-135 (Optional) psi
Pressure Differential	15-70 (Standard) psi 7-57(Optional) psi
Maximum Controlled Boilers	15 Units

► MI terminal ("slave")

The MP1 200 panel sends commands to the individual MT1 200 terminals to adjust each boiler's operation in accordance with total system conditions and requirements.

Voltage	120V (+10%, -15%)
Frequency	50/60 Hz
Control	Automatic Rotation Troubled boiler back-up Full blownown timer

see LX & EX brochures for available modular models

View Miura's
Virtual Start-Up Video

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MIURA

Miura Steam is Engineered for Greater Efficiency, Lower Costs, and Reduced Environmental Impact.