

Centauri[®]

Condensing Fire Tube Water Boiler

1,500,000 to 2,000,000 Btu/h

Inward-fired burner technology capable of 10-to-1
turndown and 10 ppm NOx at full rate

Operates on 4" Gas Pressure



Up to 94% efficiency
No minimum flow - No minimum water temperature
Simplified primary-only piping

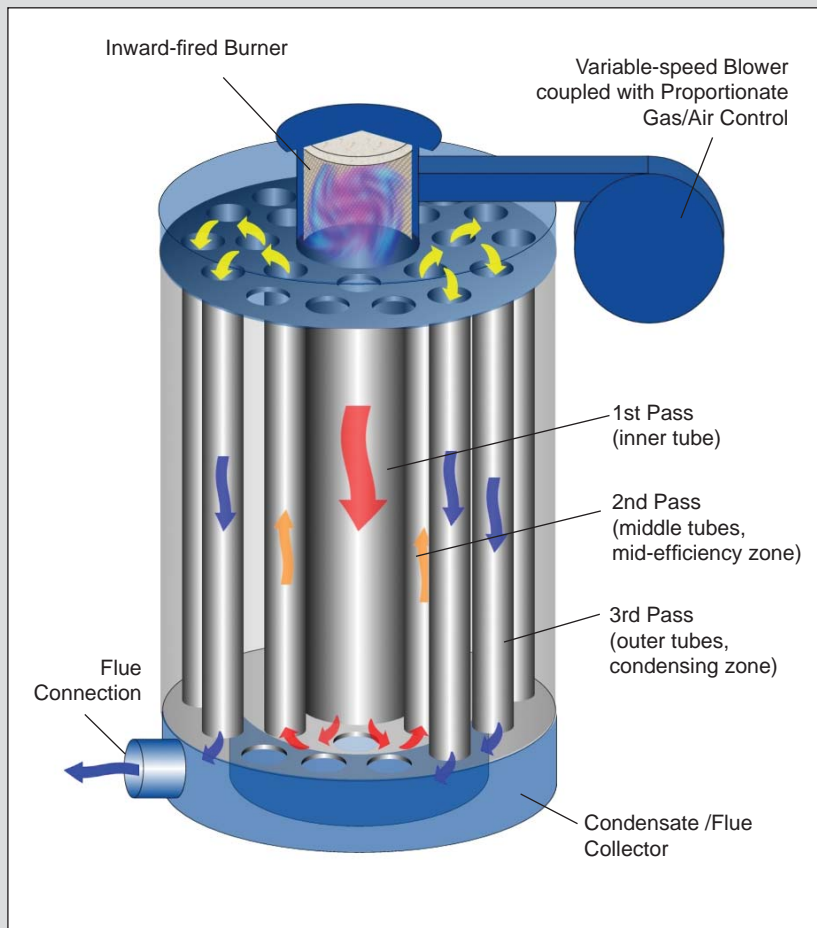


Riverside[®]
HYDRONICS

Centauri®

Condensing Fire Tube Water Boiler

MODE OF OPERATION



Centauri is a seamlessly modulating, high-efficiency, three-pass, vertical fire tube boiler. When modulated down to low fire and with low entering water temperatures, thermal efficiency 94% can be achieved.

With each successive pass through the boiler, combustion gases are cooled. In the third pass, when operating with return temperatures less than 130°F, combustion products will cool below their dew point and the entrained water vapor will condense on the tube walls. The condensate that forms will drain down the smooth tube wall into the condensate collector and will be evacuated.

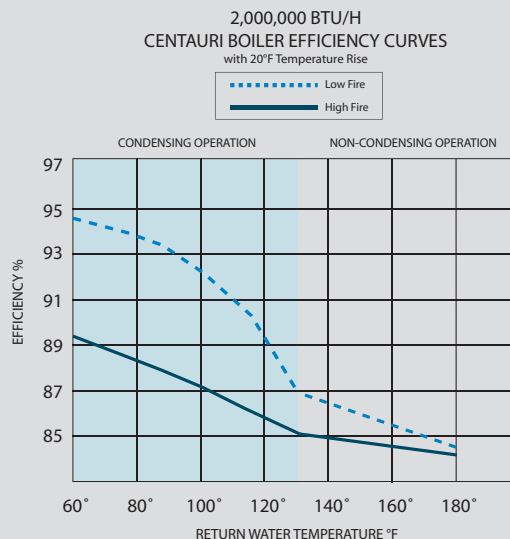
The vessel is constructed and stamped to Section IV of the ASME code and carries a 10-year non-prorated warranty on materials, manufacturing and condensate corrosion. The condensing firetubes are made from duplex stainless steel; an engineered alloy that combines the grain structures of austenitic (300 series) and ferritic (400 series) stainless steels for unrivaled corrosion protection. The condensate collector is also fabricated from stainless steel.

REDUCED OPERATING COST

Condensing operation and the resulting higher efficiency is dependent upon low return water temperature and optimized with reduced firing rates. Centauri is well suited for applications such as heat pump and snow melt where return temperatures are continuously below 110°F and the opportunity to combine these temperatures with a reduced firing rate is frequent.

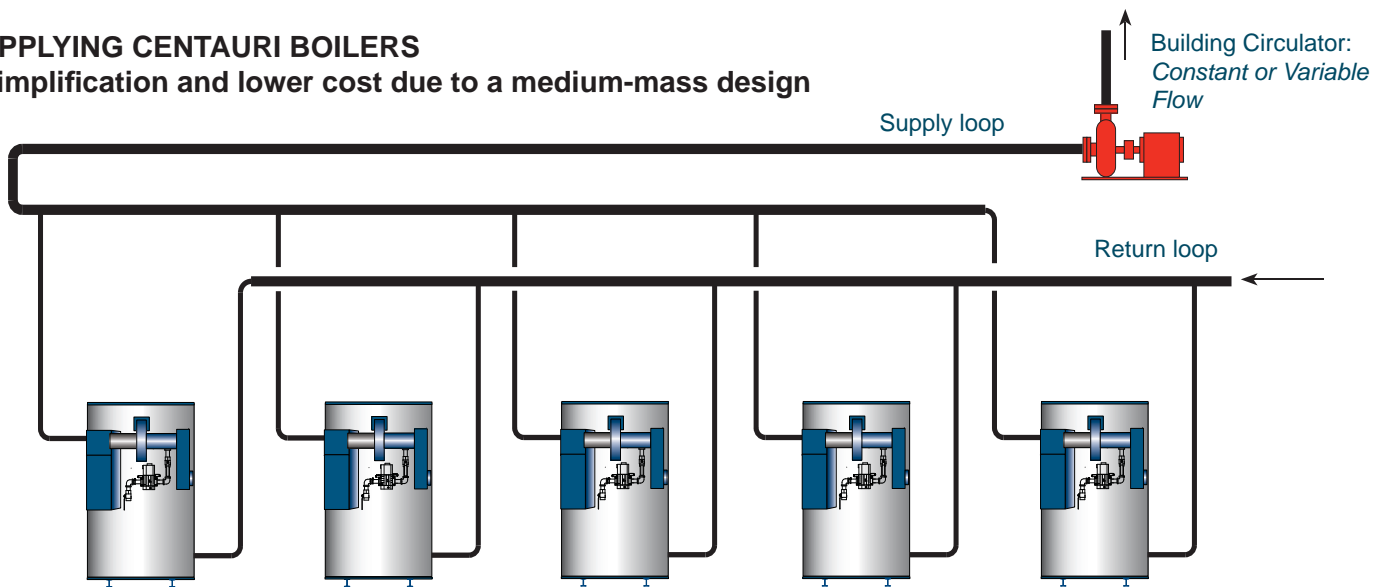
Additionally, Centauri boilers are suited for seasonal variations in boiler loop temperature, such as outdoor reset, where boiler return loop temperatures are regularly reduced to the level where condensing can occur. It's possible for the majority of the heating season to utilize low return temperatures, and a condensing boiler can significantly reduce fuel consumption.

The graph illustrates the performance of the 2 million Btu Centauri. The 1.8 and 1.5 million Btu boilers will have incrementally higher efficiency rates with reduced water temperature and reduced firing rate.



APPLYING CENTAURI BOILERS

Simplification and lower cost due to a medium-mass design



Centauri boilers contain a moderate amount of stored water. As a result, they provide several installation and operating cost advantages.

NO MINIMUM FLOW FOR FULL VFD INTEGRATION

Unlike instantaneous water tube boilers, Centauri boilers do not have a critical minimum flow rate requirement. Therefore, Centauri boilers can take greater advantage of VFD building pump systems, allowing the building flow to be reduced to much lower levels and for savings on electricity to be maximized.

NO MINIMUM INLET TEMPERATURE

The ability of the boiler to accept cold return water simplifies piping by eliminating the bypass loop and thermostatic mixing valves required to protect other boilers from condensing.

PRIMARY-ONLY PIPING

As depicted above, Centauri boilers are most often piped in a reverse return fashion using the building pump to circulate water through the boilers. This is the least costly piping approach as it eliminates the requirement for a separate pump and secondary piping circuit for each boiler.

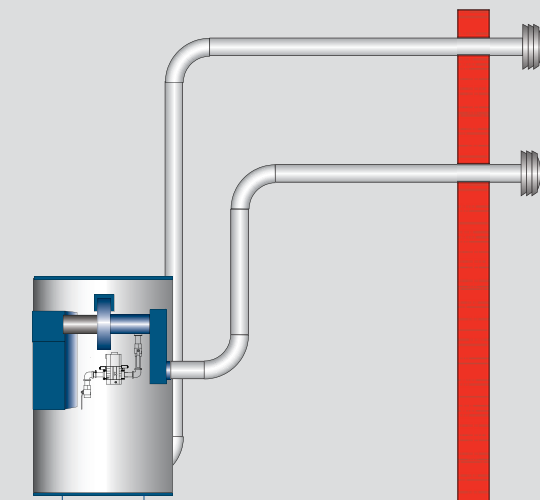
REDUCED PRESSURE DROP

Pressure drop through all models of Centauri boilers at maximum load in a loop with a 20°F temperature delta is one-half foot of head. This is about 4 foot of head less than the pressure drop of other condensing boilers that can be piped primary-only. In a multiple boiler system, the lower total pressure drop of all Centauri boilers may enable the use of a smaller building circulator, saving both in equipment cost and the electrical consumption of the pump.

LONGER, REDUCED DIAMETER VENTING

Centauri boilers can accept direct combustion air through 6-inch diameter pipe for a distance of 100 equivalent feet. It can also simultaneously direct vent through 6-inch diameter pipe for a distance of 100 equivalent feet. As with all other condensing boilers, the exhaust vent material must be an approved stainless vent.

This combined 200 equivalent feet is farther in length and smaller in diameter than most competitive condensing boilers, providing substantial savings in the cost of venting.



CONTROLS AND INTEGRATION WITH BUILDING AUTOMATION

In single-boiler installations, Centauri will utilize its onboard TempTrac® electronic operating and modulation control, which includes the following operating modes and features:

- Set point operation*
 - Outdoor reset*
 - Nighttime setback*
 - Modbus RTU serial connection for monitoring and overwrite by a building automation system**
 - LED readout of supply and return temperatures
- *Fully programmable parameters
** Gateways available for different protocols

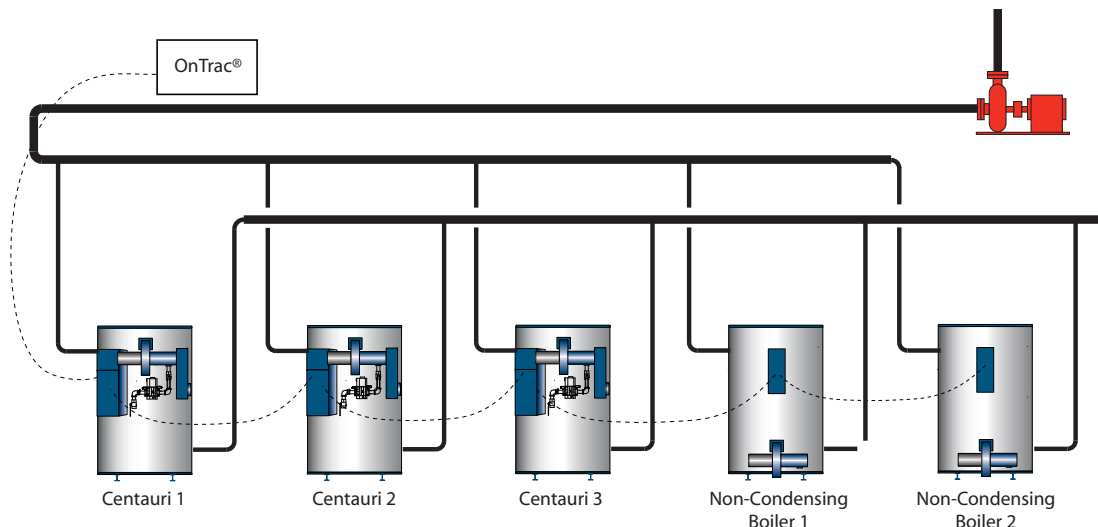


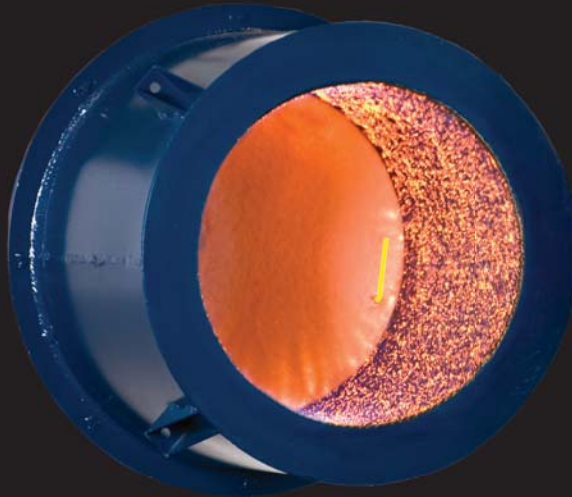
For multiple boiler installations with building automation communication over network connection, we recommend the Riverside Hydronics OnTrac® multiple boiler controller with Modbus TCP/IP protocol via an Ethernet port. This PID controller has a full-color, touch-screen programmable user interface and provides all the functions of a typical multiple-boiler control. In addition, it provides operating history and real-time reporting of boiler operation including firing rate percentage and alarm status. OnTrac communicates with each boiler's TempTrac control through a serial connection using Modbus. A simple, 2-wire daisy chain connects all boilers. Communication gateways are available for building automation systems using other protocols.



HYBRID BOILER SYSTEMS AND CONTROL - Savings on equipment and operation

Hybrid boiler systems combine condensing and non-condensing boilers to capture both fuel savings and savings in initial equipment costs. For example, Centauri boilers would be fired in parallel during warmer weather when loop temperatures allowed condensing operation and the lower cost, non-condensing boilers would supplement heat output during the colder months when loop temperatures are too high for condensing to occur. The OnTrac control was developed specifically for hybrid systems. It will lead-lag and control the firing rate of the condensing boilers as a defined group and not energize any non-condensing boiler until all condensing boilers are at full rate. The non-condensing boilers can then be energized, rotated and modulated as required and as their own group.





The Centauri inward-fired burner design results in rapid and complete combustion of fuel and air and produces a remarkably low NOx level of 7ppm at low fire, as in this actual photograph of minimum firing rate.

INWARD-FIRED BURNER TECHNOLOGY (patent pending)

This breakthrough combustion technology offers:

- NOx levels \leq 15 ppm through all firing rates on 2000 MBH boilers
- NOx levels \leq 10 ppm through all firing rates on 1800 and 1500 MBH boilers
- Full modulation with 10-to-1 turndown capability

This technology utilizes:

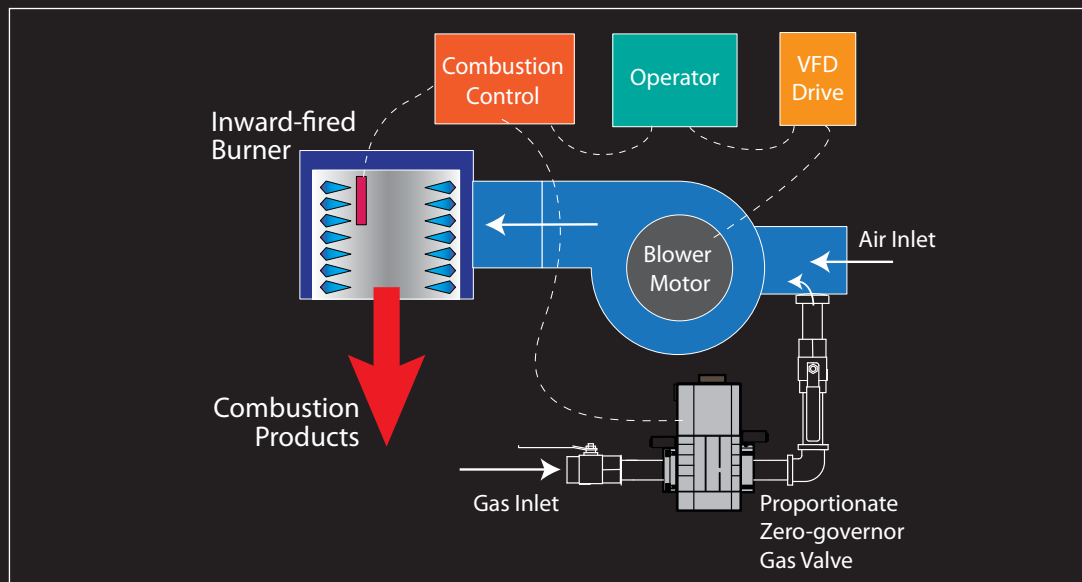
- A 360°, inward-fired, metal-matrix surface burner
- Variable frequency drive on combustion air blower for precise turndown
- Proportionate gas valve that induces gas flow based upon air flow. This system automatically maintains proper fuel-air ratio for optimum combustion under changing seasonal, weather and atmospheric conditions. It also corrects for altitude

Available for firing with:

- Natural gas
- LP gas
- Combination natural and LP gas (dual gas train)

Available voltages for VFD and blower motor:

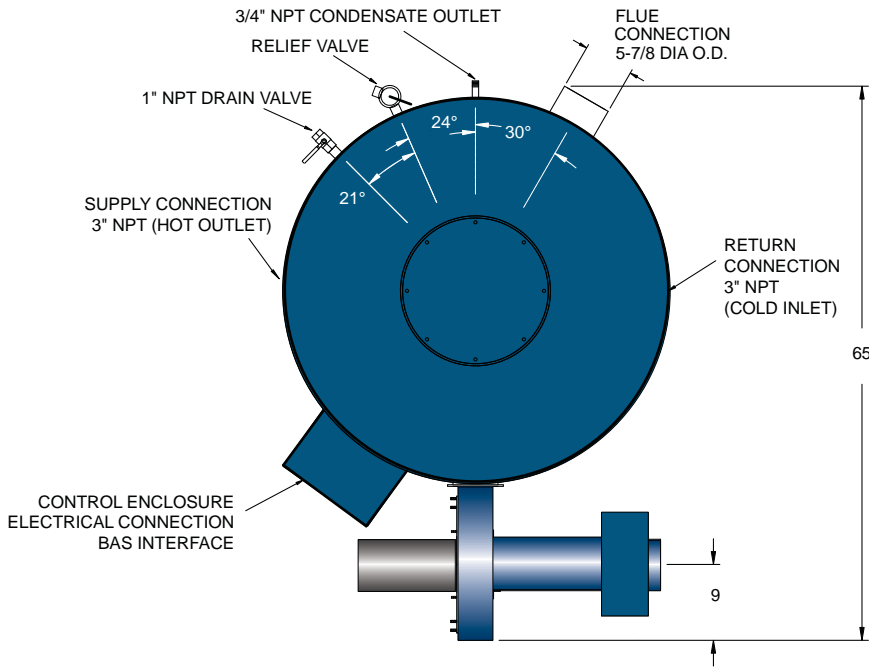
- 115/230V, 1Ø
- 208/230V, 3Ø
- 460V, 3Ø



CENTAURI MODEL SIZES AND DIMENSIONS

Model Number	Maximum Input Btu/h
2000 WB 250A-IFC	2,000,000
1800 WB 250A-IFC	1,800,000
1500 WB 250A-IFC	1,500,000

Centaury boilers are ETL-listed to U.S. and Canadian standards and comply with CSD-1, FM and ASHRAE 90.1.



Standard Electrical

120V, 1Ø, 60 Hz., 11 amp

Optional Electrical - Single Point Connection with 120V Control Circuit Transformer Included when 3-Phase Power is Supplied

240V, 1Ø, 60 Hz, 6 amp
 208/230V, 3Ø, 60 Hz, 3.5 amp
 480 V, 3Ø, 60 Hz, 2 amp

Venting

ETL, UL or ULC listed
 Category IV, 6" metal vent.
 Minimum distance 5 feet.
 Maximum distance 100 eq. feet and maximum 1.3" W.C. pressure

Inlet Combustion Air

Up to 100 eq. feet using PVC or galvanized vent pipe and 0.0" to -1.0" W.C. pressure

