MIURA

EX-Series Dual Fuel
Gas/Oil Steam Boiler

EX

SCAN FOR MORE

EX BOILER INFO

MANUFACTURED IN

THE USA

Proudly Manufactured in our Rockmart, Georgia Headquarters.

"Miura aims to be your best partner for energy, water and environment."

Global Leader in Modular, On-Demand Steam Technology

MIURA

Since 1927, Miura has been revolutionizing the way industries use and generate steam. Manufactured with Safety, Efficiency and Reliability as core design philosophies, this innovative technology was released in North America in 1989. Now built "safer-by-design" in Rockmart, GA, the compact, modular, and fast-response design has earned a best-in-class safety record during 60 years of production with zero catastrophic incidents recorded across all global markets served.

We recognize that the products we manufacture today affect the lives of generations to come. We are dedicated to building boilers that protect not only the people that operate them, but also the environment we call home. Maximizing efficiency while reducing harmful emissions protects the environment and helps build a better tomorrow for all.

Miura's expertise does not stop with boilers. From water treatment to advanced monitoring, support, and maintenance contracts, our Complete Steam Solutions are backed by a company, team, and technology you can count on.

Miura offers the gold standard of an all encompassing package that not only keeps your facility operating at peak efficiency, but also helps to manage the items surrounding the boiler room.

We're proud to be setting the new standard for steam generation in the USA and thrilled that you have chosen to learn more about our commitment to the market and available products. Thank You!

EX-SERIES STEAM BOILER

Prepare to rethink the steam boiler. Miura's modular EX-Series boiler serves as the foundation of safe, reliable, and efficient steam systems and is fully scalable for evolving needs. Achieve exceptional performance with the peace of mind that steam will be there when you need it.

PRESSURE OPTIONS

Standard Pressure

- **Horsepower:** 100 – 300 BHP
- **Steam Output:** 3,450 – 10,350 LB/HR*
- **Operating Pressure Range:** 70 – 150 PSIG**
- **Efficiency:** up to 85%
- **Fuel Type:** Natural Gas, Propane, No. 2 Oil
- **Emissions:** as low as 50 PPM NOx

Low NOx with FGR

- **Horsepower:** 250 – 300 BHP
- **Steam Output:** 8,625 – 10,350 LB/HR*
- **Operating Pressure Range:** 70 – 150 PSIG**
- **Efficiency:** up to 85%
- **Fuel Type:** Natural Gas, Propane, No. 2 Oil
- **Emissions:** as low as 30 PPM NOx

High Pressure

- **Horsepower:** 200 – 300 BHP
- **Steam Output:** 6,900 – 10,350 LB/HR*
- **Operating Pressure Range:** 170 – 270 PSIG**
- **Efficiency:** up to 84%
- **Fuel Type:** Natural Gas, Propane, No. 2 Oil
- **Emissions:** as low as 100 PPM NOx

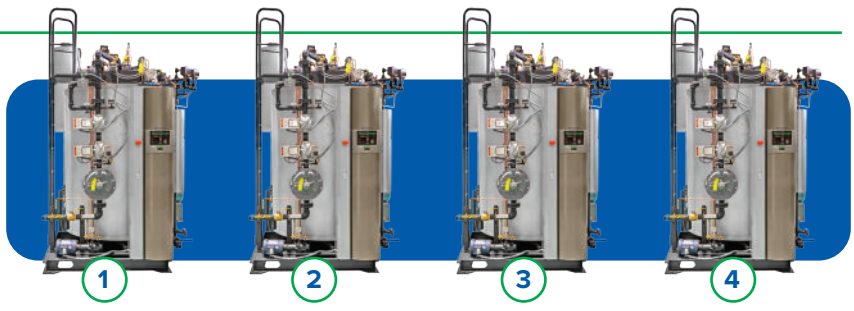
Low NOx with FGR

- **Horsepower:** 250 – 300 BHP
- **Steam Output:** 8,625 – 10,350 LB/HR*
- **Operating Pressure Range:** 170 – 270 PSIG**
- **Efficiency:** up to 84%
- **Fuel Type:** Natural Gas, Propane, No. 2 Oil
- **Emissions:** as low as 40 PPM NOx

Need More Steam Output?

Miura boilers are designed to be part of a multiple installation (MI) system. Users benefit from true scalability by adding or removing units and enhanced reliability from having inherent "back-up" (see page 8 for more info).

Multiple Installation (MI) Boiler System
(4) 300 HP Boilers = 1200HP Capacity



EX-SERIES BIOGAS BOILER

For organizations looking to reduce their environmental impact, the Miura EX-Series Biogas steam boiler operates on renewable biogas fuel blends. Weather created as a by-product or purchased, biogas can be a smart way to recycle waste and reduce the dependency on fossil fuels.

WHAT IS BIOGAS?

Much like the name suggests, biogas is a mixture of gases consisting of mostly methane and carbon dioxide that's produced by fermentation of organic matter in an anaerobic digester. Organic material consists of waste from animals, food, agriculture or wastewater. When fed into a digestion tank, it creates co-products such as fertilizer and biogas. Capturing biogas and using it as fuel helps mitigate its methane emissions that would otherwise escape from landfills and pollute the environment – making it a sustainable and renewable energy source.

MIURA BIOGAS OPTIONS

By harnessing Miura Group's experience in renewable fuels, Miura America developed an EX-Series steam boiler option that utilizes biogas fuels. Additional options include using natural gas as a backup fuel source with a dual gas train. It's the safety, efficiency and reliability that you expect with a Miura boiler combined with the benefits of renewable energy.

BIOGAS FUEL REQUIREMENTS

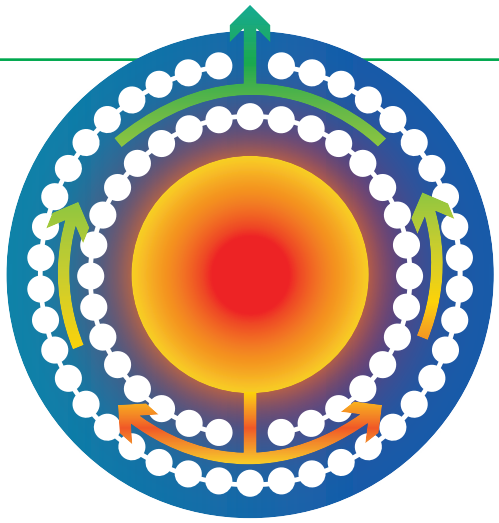
To operate with Biogas, the EX-Series steam boiler must meet the following fuel composition requirements. Our engineering experts will work with you on further specific design details based on your facility's unique need.

Component	Composition	Fluctuation
Hydrogen Sulfide (H_2S)	≤ 100 ppm	
Carbon Monoxide (CO)	≤ 500 ppm	
Methane (CH_4)	≥ 60%	± 1.5%
Carbon Dioxide (CO_2)	≥ 40%	± 1.5%
Total High Heating Value	≥ 612 BTU/SCF	± 2.5%
Siloxane	0 ppm	
Supply Gas Pressure	Must be determined based on high heating value	

See Biogas Fuel Requirements document [EN-SC-101] for more details

UNIQUE OMEGA FLOW DESIGN

The EX-Series boiler features a vertical water tube pressure vessel with a unique "omega flow" layout, including different types of finned tubes as part of the high efficiency design. These finned tubes turbulate the hot gas between the inner ring and outer ring and create more surface area to optimize heat transfer for maximum efficiency and ultra-fast steam generation.



OMEGA FLOW Pressure Vessel Flame Path

EASY DUAL-FUEL TRANSITION

The EX-Series steam boiler is designed to use Natural Gas, Propane, or #2 Fuel Oil making it extremely versatile. These gas and oil fuel options are ideal for facilities that need to have a secondary fuel source. By flipping a fuel selector switch, the EX boiler can fire a backup fuel in the event of curtailment of the primary fuel. This prevents downtime which can often be outside of the customer's control.

COMPACT FOOTPRINT

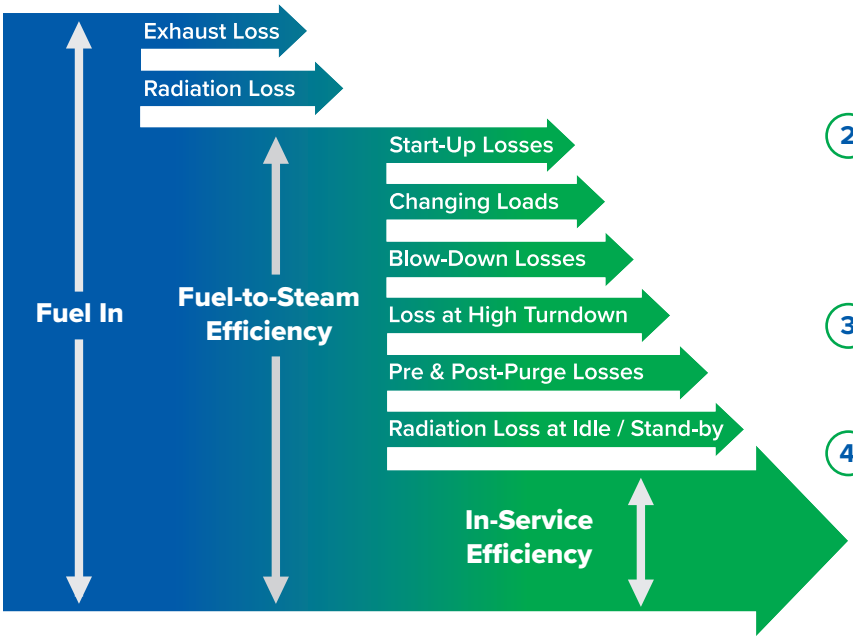
Facility floor space is valuable, and the EX-Series compact low-water content design features a vertical pressure vessel that reduces the traditional boiler footprint by about half, which helps facilities increase the steam capacity output of their current boiler room. The compact footprint also allows for easier installation and improves scalability, giving facilities flexibility to grow when needed.

EASY MAINTENANCE

The easy-access and modular design of the EX-series makes maintenance safe and simple. Perform routine inspections and maintenance one boiler at a time while others remain in operation for uninterupted production. Many of the components are easily accessible on the exterior of the boiler, and most procedures can be performed with a screwdriver or adjustable wrench, without the need for heavy equipment or chain hoist, minimizing the risk of injury.

OPTIMUM IN-SERVICE EFFICIENCY

To correctly assess the efficiency of the boiler system, many factors of the boiler operation need to be taken into account – the "real" efficiency is what we call the "in-service-efficiency" (see diagram below). Miura EX boilers and its modular concept bring the best in-service efficiency in the industry:



1. Compact, low-water-content design drastically reduces the energy needed to heat up the water and heat exchanger before starting to produce steam, also known as start-up loss.

2. Modular steam systems allow each unit to operate at peak efficiency regardless of steam demand fluctuations and seasonal changes. The most efficient boiler is the one that is kept OFF when not required.

3. EX model's compact design minimizes the purge time requirement, reducing the purge loss that happens when the burner has to turn OFF-ON.

4. By being compact, the radiation loss is naturally small. Furthermore, by keeping part of the boiler system OFF and cold, the loss is drastically smaller compared to that of a large, high-turn-down boiler that remains ON regardless of steam demand.

UNPARALLELED SAFETY

With more than 150,000 units in operation worldwide, Miura's once-through watertube boilers are built safer-by-design with an unmatched safety record of zero catastrophic failures resulting in casualty. The low water content design reduces stored energy and utilizes many layers of safety cutoffs, greatly reducing risk of a simple failure resulting in a large catastrophe.

MODULAR BOILER SYSTEM DESIGN

The ability to produce full steam in less than 5 minutes from a cold start, and to easily turn ON and OFF with short purge time adds flexibility in the boiler operation. The operator can easily turn boilers ON and OFF when needed based on the steam demand and operation schedule. When combined with the BP Panel, Miura's proprietary multiple boiler controller, the system can be modified and monitored together providing the operator with an all-inclusive peace of mind.

Miura 1200HP Modular Boiler Solution

SUSTAINABILITY

Miura GROUP understands the responsibility to care for the environment for future generations with sustainable steam. High-efficiency steam boilers in a modular array reduces overall fuel consumption and emissions creation related to steam production. The Miura EX-Series boiler comes standard with 100 ppm NOx emissions, and as low as 30 ppm NOx in the low NOx option. In addition to complying with local regulations, choosing equipment with low emissions goes a long way to protecting the atmosphere.

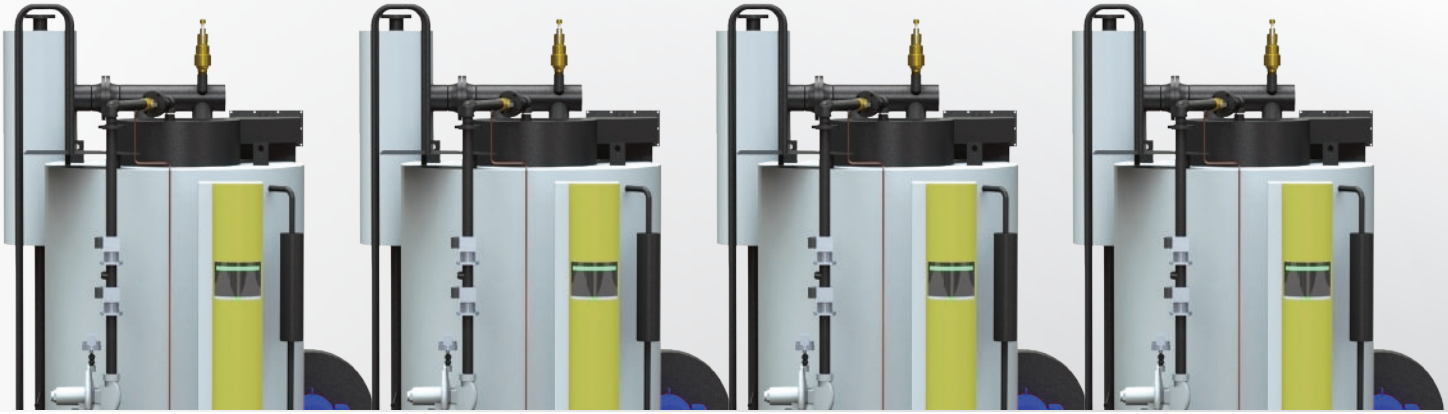
ADVANCED BL CONTROLLER

The BL Controller, the brain of the boiler, monitors hundreds of data points and ensures the healthy operation of the boiler. When an early caution sign or a minor issue is detected, the yellow light "caution" is displayed with fault code information on the front LCD panel to guide the operator in maintenance work. In some cases, the BL keeps the boiler running on backup operation mode before a critical failure occurs, requiring the BL to shut down the boiler and signaling a red light "alarm". Through a phone or Internet connection, data can be monitored by Miura technicians or sent directly to company personnel for peace of mind and reliable steam.

ECONOMIZER COMES STANDARD

Unlike other boilers in the market, Miura boilers come standard with a load of added benefits, including a heat recovery economizer. The economizer captures otherwise wasted heat from the combustion exhaust to preheat the incoming feed water. With this, the Miura EX boiler produces steam using less fuel while operating at increased efficiency.

BENEFITS OF MODULAR DESIGN



ON-DEMAND STEAM: Boiler Turns On Only When Necessary

The modular concept achieved with quick start-up and compact design of the EX series allows the optimized efficiency and flexible operation of the steam system. Multiple boiler units work in-tandem to manage the steam load efficiently by quickly adjusting firing stages or placing units in standby when not needed. This is designed to manage fluctuating steam demands efficiently to reduce fuel consumption and emissions creation. It leads to fuel savings and lower emissions over more traditional systems by cutting wasted fuel by turning off when not in use and not requiring them to stay warm or idle to meet demand. Operators have the flexibility, for example, to run a just a portion of the system to match reduced steam demand, as opposed to keeping the full system online, even if there is less demand. Take advantage of Miura's modular design to save valuable time, fuel and emissions.

LOW STEAM DEMAND	MEDIUM STEAM DEMAND	HIGH STEAM DEMAND
		
LOW FIRE OFF OFF	OFF LOW FIRE HIGH FIRE	HIGH FIRE HIGH FIRE HIGH FIRE

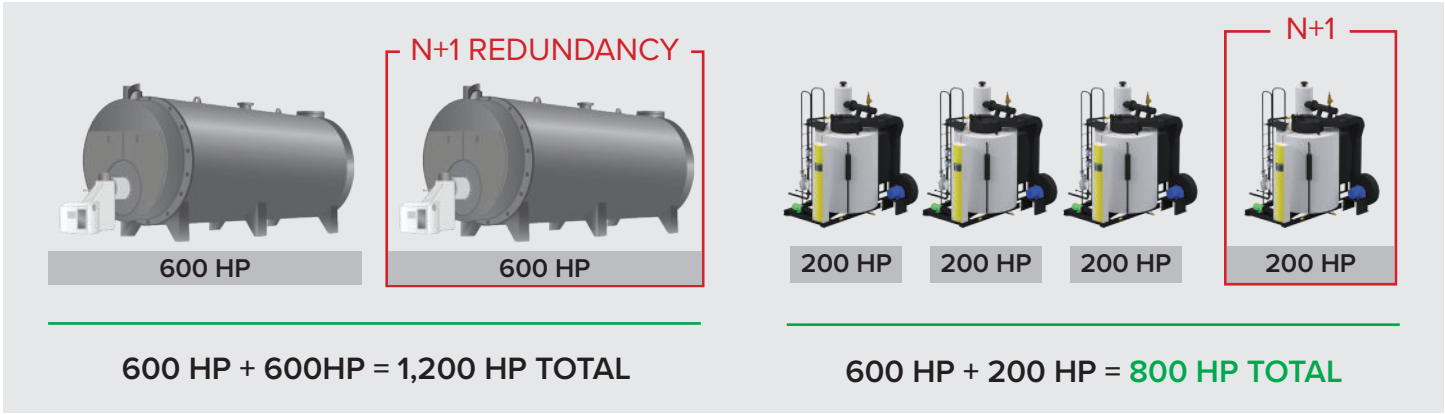
SCALABLE STEAM: Long-Term Flexibility

Your steam equipment should always match your business goals. Miura's modular design is easily scalable by adding units as production increases or turning off units if need decreases due to trends or a sudden stop in production. Modular scalability adds greater flexibility to your business, with size and operational methods no longer restricting the ability to change capacity. The compact footprint fits twice the steam output in the same square footage, so you won't compromise space or require a construction overhaul for system expansion. It's the only steam system that can incrementally scale up or down to provide a matching steam generation system for your load profile to endure through the changing years to come.

INITIAL INSTALLATION - 600HP	DEMAND INCREASES - 900HP	DEMAND DECREASES - 300HP
		
EX-300 EX-300 OPEN	EX-300 EX-300 EX-300	EX-300 OFF OFF

PLANNED RELIABILITY: N+1 Redundancy

In a modular steam system, the risk is spread across multiple units, giving businesses improved reliability for continuous steam production. During plant inspection or maintenance, steam output responsibility shifts to other boilers in the system, diminishing the risk of production shut down. Instead of relying on one large boiler and another large emergency unit serving as N+1 redundancy, modular systems use multiple compact units to meet the full steam demand amount with an additional compact boiler serving as the N+1 redundancy. This method saves significant money and valuable boiler room space.



As you can see, with Miura's EX-Series modular, on-demand boilers, there is power in numbers. It's a modern steam generation system that provides flexibility, scalability, and reliability you can trust.

TRADITIONAL BOILER CHALLENGES VS. MIURA MODULAR SOLUTIONS

How can we increase steam capacity for use when production demand increases?

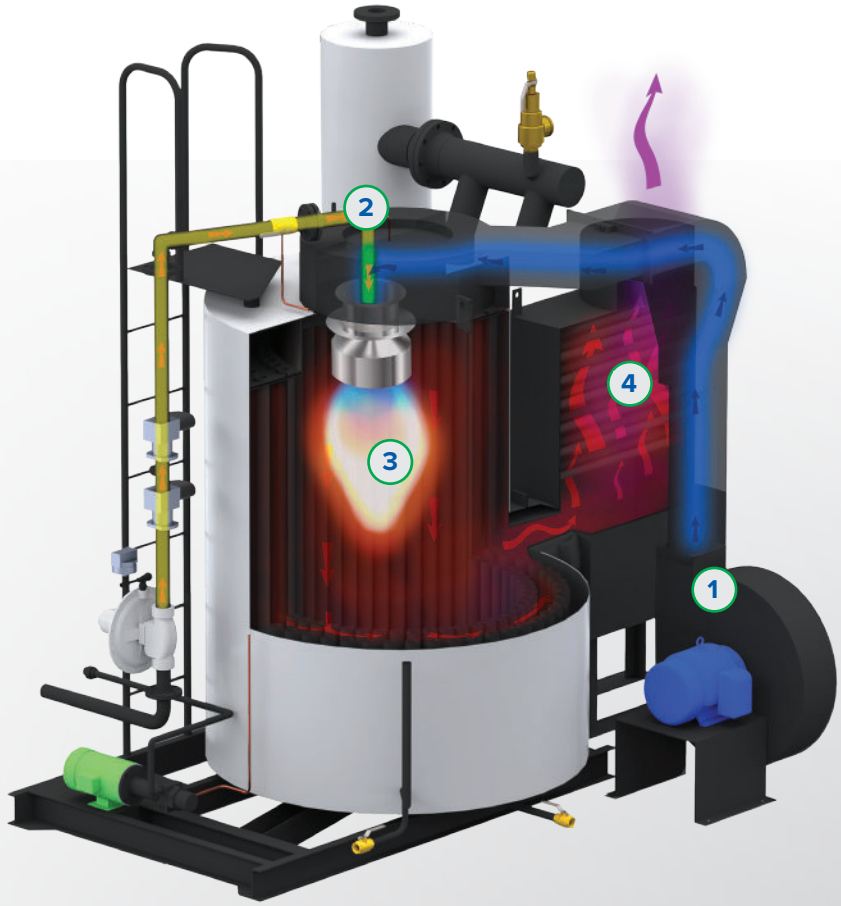
TRADITIONAL BOILER CHALLENGE	MIURA MODULAR SOLUTION
Large firetube boilers are usually sized to supply the maximum facility demand when installed. When demand increases, the large horizontal pressure vessel drum creates space constraints for additional units. Any supplemental firetube boilers have to be kept ON in idle mode to be ready when spikes occur.	Miura's EX-Series modular boilers grow with you. The compact design makes it easy to add units when production requires more steam. Boilers automatically turn ON/OFF based on facility demand, so boilers only used during peak loads don't have to stay on all the time.

Is it possible to avoid production interruption during planned maintenance and yearly inspections?

TRADITIONAL BOILER CHALLENGE	MIURA MODULAR SOLUTION
The firetube boiler size and complexity to open makes yearly boiler inspections and maintenance a burden. It interrupts production for at least two to three days to let the boiler cool, empty, disassemble, inspect, reassemble, fill and heat.	With Miura boilers, production interruptions are a thing of the past. Operators inspect and maintain the multiple smaller units in a modular system one at a time. This eliminates the need to shut down production for servicing.

COMBUSTION SEQUENCE

Miura's proprietary once-through watertube design has achieved many engineering milestones such as increased in-service efficiency, world-class reliability and an industry-leading safety record. The safer-by-design system produces steam from a cold start in minutes, making it the best choice for energy efficiency.



1 Air Intake

Ambient air pulled through replaceable filters mounted on the air box and propelled into the wind box by a blower.

2 Air and Fuel Mixing

Combustion air is mixed with the fuel in the gas chamber. Then, the mixture passes through the burner and is ignited.

3 Combustion / Heat Exchanger

The burner on top of the pressure vessel projects a large flame in the center of the heat exchanger. The hot gases are forced through the "Omega Flow" where heat transfer is optimized with finned tubes for better heat absorption.

4 Heat Recovery

The combustion exhaust exits through the heat recovery economizer that uses exhaust heat to preheat the incoming feed water.

WATER JOURNEY

Miura's watertube technology stems from over 60 years of perfecting the design to enhance efficiencies. From the feed water supply to steam in your facility, Miura's complete steam solution efficiently preserves resources, and recycles energy for sustainability and costs savings. Intuitive sensors monitor each step of the water journey and integrate with the complete system.

5 Economizer Feed Water Preheat

Incoming feed water is routed through a heat recovery economizer to raise the temperature of the water which increases the efficiency of the boiler.

6 Main Pressure Vessel

Water fills inside the tubes from the bottom of the pressure vessel and receives heat from the combustion gases. The water boils and then converts into steam.

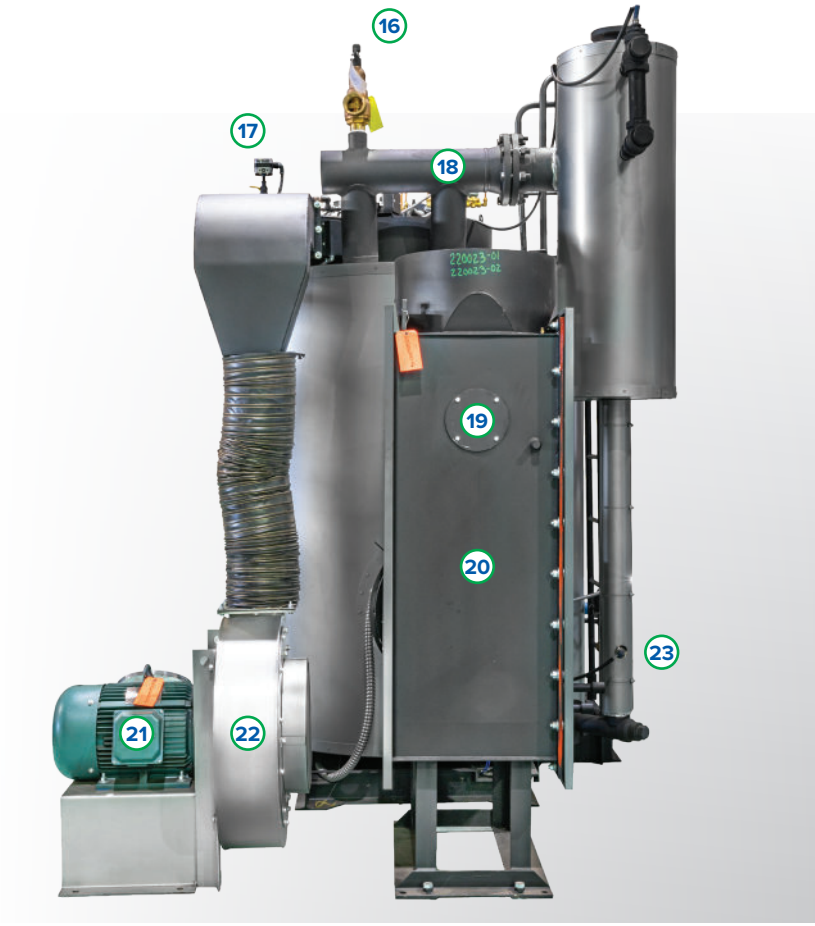
7 Steam Collection Drum

Raw steam rises from the water tubes into the steam collection band around the top of the pressure vessel and then travels to the steam separator.

8 Steam Separator

The steam separator allows the dry steam to exit to the process equipment and recirculates the moisture back to the pressure vessel.

1. **Steam Outlet:** Piping where steam exits boiler
2. **High Fire Valve:** Solenoid valve opens in high fire to increase gas flow
3. **Gas Safety Shut-off valves:** Valve closes when not in combustion stage to ensure no gas flow into PV
4. **Main Gas Regulator:** Reduces incoming natural gas pressure for proper burner operation
5. **Natural Gas Inlet:** Connection point for gas line into the boiler
6. **Oil Pump:** Used to pump #2 fuel oil fuel into burner assembly during oil combustion
7. **Emergency Shut-Off:** Shut off button in case of an emergency
8. **BL Controller:** Boiler main control panel for start/stop, alarm/caution insight and setting adjustments
9. **Steam Pressure Switches:** Used to turn off boiler or alarm when steam pressure is too high.
10. **Upper Inspection Plug:** Used to access pressure vessel for inspection
11. **Liquid Volume Controller (LVC):** Uses probes to determine water level inside PV
12. **Pressure Vessel (PV):** Miura “Once-Through” floating header EX pressure vessel
13. **Lower Inspection Plug:** Used to access pressure vessel for inspection
14. **Bottom Blow down Valve:** Used to drain pressure vessel water
15. **LVC Blow down:** Used to clear contents out of LVC



16. **Safety Relief Valves:** ASME Section I rated safety relief valves
17. **Low Air Pressure Switch:** Sounds alarm if air pressure drops below set point
18. **Steam Header:** Collects steam directly from PV
19. **Economizer Inspection Port:** Allows easier inspection of economizer
20. **Economizer:** Heat recovery device that utilizes exhaust heat to preheat incoming feed water
21. **Blower Motor:** Three-Phase motor to turn impeller
22. **Blower:** Fan that pulls air from outside and propels into combustion chamber
23. **Conductivity Probe:** Determines level of dissolved solids in boiler water

24. **Ladder:** Used to access top of boiler
25. **High Water Alarm:** Boiler will alarm if water touches this probe
26. **Steam Separator:** Unique design provides dry steam to process equipment
27. **Wind Box:** Air from blower is mixed with fuel source and pushed into furnace for burning
28. **Exhaust Outlet:** Duct for expulsion of exhaust gas
29. **Economizer Water Inlet/Exit:** Feed water piping to enter the economizer and exit to PV
30. **Economizer Drain:** Piping to drain condensation from economizer PV
31. **Surface Blow Down:** Controls concentration of impurities in boiler water. Control built into BL controller.

DIMENSIONS

FOR REFERENCE ONLY!
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Contact your sales representative for latest drawings and data.

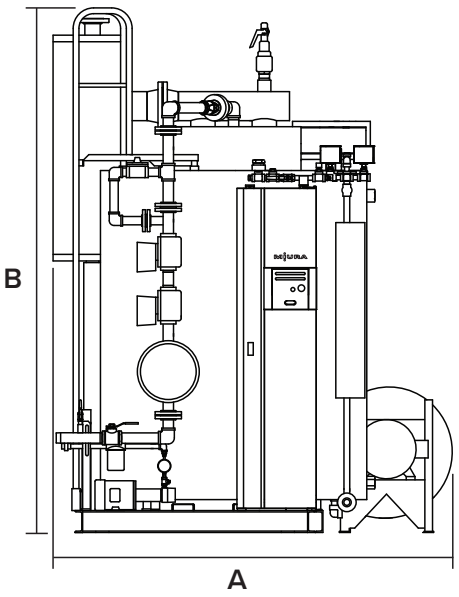

Figure 1 - Front View

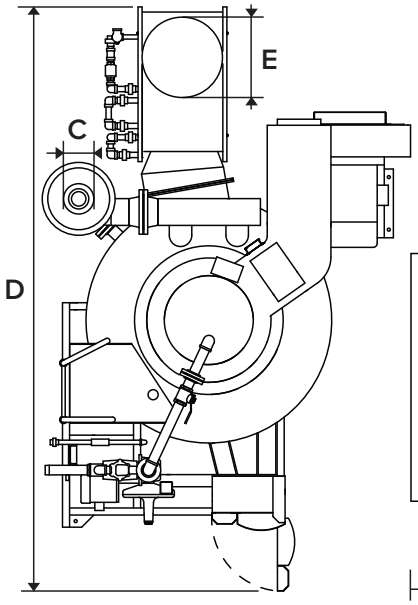

Figure 2 - Top View

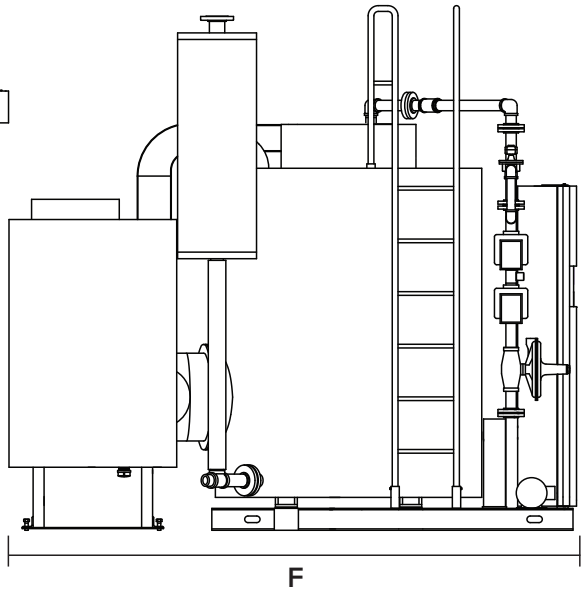

Figure 3 - Side View

Pressure Option	Model Number	Width	Height	Steam Outlet	Door Open	Chimney Outlet	Length	Shipping Weight	Operation Weight
		(A)	(B)	(C)	(D)	(E)	(F)		
	UNIT	Min IN.	IN.	IN.		IN.	Min IN.	LBS	LBS
Standard Pressure	EX-100SGO-07	80 ⅛"	98 ⅞"	2" NPT	123"	14" O.D.	108 ½"	5,300	5,900
	EX-150SGO-07	91"	119 ⅝"	3" 150# Flange	144 ⅜"	20" O.D.	130"	8,800	9,600
	EX-200SGO-07								
	EX-250SGO-07	93 ⅞"	145 ¼"	4" 150# Flange	149 ⅝"		135 ⅛"	9,000	10,000
	EX-300SGO-12	98 ⅝"	165 ⅞"		158 ⅞"		142 ⅞"	12,400	
High Pressure	EXH-200SGO-07	89 ¾"	119 ⅝"	3" 300# Flange	144 ⅜"	20" O.D.	130"	9,700	10,600
	EXH-250SGO-07	105 ¼"	156 ⅛"	4" 300# Flange	156 ¼"	26" O.D.	141 ¾"	13,900	15,100
	EXH-300SGO-07								
Low NOx	EXN-250SGOF-07	113 ⅝"	156 ⅛"	4" 150# Flange	156 ¼"	26" O.D.	140 ½"	12,400	13,600
	EXNH-250SGOF-07			4" 300# Flange			141 ¾"	13,900	15,100
	EXN-300SGOF-07			4" 150# Flange			140 ½"	12,400	13,600
	EXNH-300SGOF-07			4" 300# Flange			141 ¾"	13,900	15,100

SPECIFICATIONS

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Contact your sales representative for latest drawings and data.

Pressure Option	Model	BHP	MAWP	Steam Output*	Heat Output	Efficiency	Fuel	Power Supply	Gas Pressure	Water Content
	UNIT	BHP	PSIG	LB/HR	MMBTU/HR				PSIG	GAL
Standard Pressure	EX-100SGO-07	100	170	3,450	3.348	85%	Natural Gas, Propane & #2 Oil	575,460,380,230 or 208 Volts, 3 Phase, 60 Hz	3-5 (Natural Gas & Propane) 0-3 (#2 Oil)	66
	EX-150SGO-07	150		5,180	5.022					89
	EX-200SGO-07	200		6,900	6.695					89
	EX-250SGO-07	250		8,630	8.369					110
	EX-300SGO-12	300		10,350	10.043	86%				155
High Pressure	EXH-200SGO-07	200	300	6,900	6.695	84%				97
	EXH-250SGO-07	250		8,630	8.369					143
	EXH-300SGO-07	300		10,350	10.043					
Low NOx	EXN-250SGOF-07	250	170	8,630	8.369	85%				60
	EXNH-250SGOF-07		300			84%				136
	EXN-300SGOF-07	300	170	10,350	10.043	85%				
	EXNH-300SGOF-07		300			84%				143

* *Steam output values are based on nominal conditions and the output of the boiler may vary based on specific applications.*
** *Operating within this range ensures proper steam quality and limited relief valve leakage. Setpoint must be below the listed maximum operating pressure to accommodate overshoot. Contact your Miura representative to confirm operating pressure range for your specific application.*

Notes:

Serving Industry Across America

"Our engineering team visited several hospitals and ended up choosing Miura. They were impressed with the versatility of the boilers from an operational perspective and the ease of maintenance. We needed something that answered carbon reduction, emissions reduction, cost savings, and reliability all in one and the Miura EX was the answer."

-Director, Facilities and Engineering
Hospital Group

"The dual fuel aspect of the EX was huge for us. In the event of a curtailment of the primary fuel, which normally would cause a loss of production, we can simply switch to the backup fuel source with the flip of switch and production doesn't skip a beat."

-Boiler Operator
Poultry Processor

"I've worked with fire tube boilers for years, and when you're around them there's always that fear that something could go wrong. Since we've installed the EX boilers, we've felt safe. I don't have to worry about what's happening in my boiler room when I'm at home on the weekends."

-Facilities Manager
Industrial Manufacturing

"The compact size of the EX allowed us to increase our steam capacity without adding on to the boiler room. They are also very easy to use. Which was something we really wanted, especially with some of our senior staff beginning to retire."

-Facilities Director
State University

MIURA | ON-DEMAND STEAM SOLUTIONS

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