

BOILER SURVEY

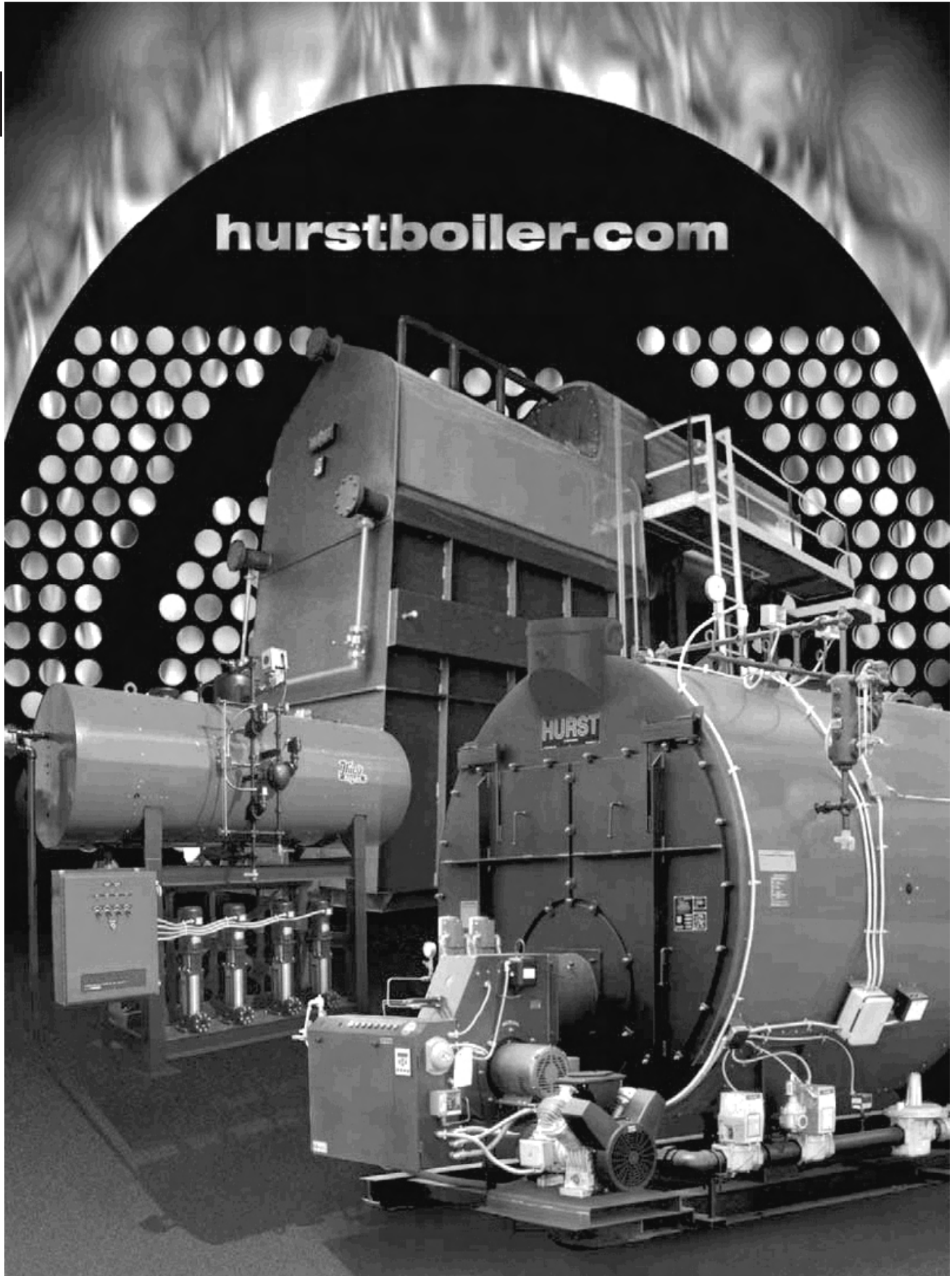
WHICH BOILER?--BOILER TYPES, COST COMPARISON & AVAILABILITY INFORMATION

Federal Corporation stocks hot water boilers from 400,000 btuh through 1,500,000 btuh for immediate delivery. We also represent many quality manufacturers: Hurst Boiler, Thermal Solutions, Rite Boiler, Peerless, and LAARS. NOBODY in Oklahoma has more boiler experience. At Federal, we are THE boiler people, and have been since 1918.

The following spread sheet details the different types of boilers we offer and their characteristics. The Tech Tips (in the back of the catalog) provide useful information to make your decisions. Contact our office if you need further information on any type of boiler. We welcome the opportunity to visit your jobsite or to review plans with you to assist you in the selection of your next boiler.

Federal Corporation Boiler
Survey Sheet

BOILERS	Capacity Range	Steam ?	Water ?	Domestic Hot Water?	Package?	Burner ?	Efficiency	Cost Comparison	Est. Life Expectancy	Manufacturer Lead Time
	INPUT in MBH (BHP)	L=low pres.15# H-high pres.150#	L= low pres.30# H-high pres.125#		P=Packaged KD=Knocked Down	A=Atmospheric Gas PB=Power Burner GO=Gas and/or Oil DCA=Duct. Comb Air	(Repre- sentative)	1=Small Water tube Boiler Cost.	40+ 40+ 30	CALL US CALL US CALL US
Hurst Scotch Marine, steel	1,260 - 63,000 (30-1500 HP)	L H	L H		P	PB GO	83%	2	40+	CALL US
Hurst Firebox, steel	527 - 20,587 (15-615 HP)	L	L		P	PB GO	83%	2	40+	CALL US
Hurst Vertical Tubeless	6-100 HP	L H	L H		P	PB	83%	2	30	CALL US
Thermal Solutions , copper tube	250 - 3,000		L H	Y	P	PB Modulating DCA	88%	1.8	20	Fact. Stock
Thermal Solutions , cop,tube, condensing	750 - 2,000		L H		P	PB Modulating DCA	97%	2	20	Fact. Stock
Peerless 211A Series, C.I. Sec.	630 - 7,560 (15-181 HP)	L	L		P KD	A	80%	1.5	30	Fact. Stock
Peerless 63/64 Series, C.I. Sec.	88 - 632	L	L		P KD	A	80%	1.5	30	Fact. Stock
Peerless LC Series, C.I. Sec.	686 - 4,663 (16-113 HP)	L	L		P KD	PB GO	81%	1.5	30	3-4 wks.
Peerless MI Series, C.I. Sec.	70 - 260		L		P	A	82%	1.5	30	Fact. Stock
Peerless PureFire, SS	50 - 140		L		P	DCA-Modulating	96%	3	20	Fact. Stock
LAARS NeoTherm, SS	285 - 500		L H		P	DCA	90%	2	20	2-4 wks.
LAARS Mighty Therm, cop. tube	175 - 5,000		L H	Y	P	A	81%	1	20	2-4 wks.
LAARS Mighty Therm II, Pennant	500-2,000		L H	Y	P	PB w/DCA	85%	1.3 - 1.5	20	OKC stock
LAARS Rheos	1,200 or 2,400 input		L H	Y	P	PB w/DCA	87%	1.5	20	stock-2 w.
LAARS Rheos +	1,200 or 2,400 input		L H	Y	P	PB w/DCA	98%	2	20	stock-2 w.
Rite, steel watertube	480 - 12,500 (11.5-300 HP)	L H	H		P KD	A or PB-GO	80%	1	35	4-6 wks.
Rite, Durafin watertube	300 - 10,000 (7-250 HP)		H		P	PB	85%	2.4	35	4-6 wks.



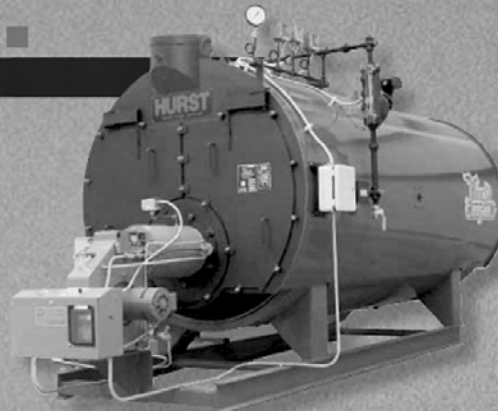
■ PERFORMANCE BOILERS ■

500 SERIES

Four Pass Wet Back Packaged Scotch Boilers.
Available in Steam or Hot Water Versions 30 to 1,500 HP.
Pressure to 250 PSIG. Available with LOW NOx.

More Models Available

Visit www.hurstboiler.com for the latest product data, distributor, technical information and literature posting, as well as info on news, events, and specials.



400 SERIES

Three Pass Wet Back Design,
30 to 1,800 HP
15 to 300# steam
30 to 160# hot water.
Available with LOW NOx.



MANUFACTURING ■
SALES ■
SERVICE ■
PARTS ■

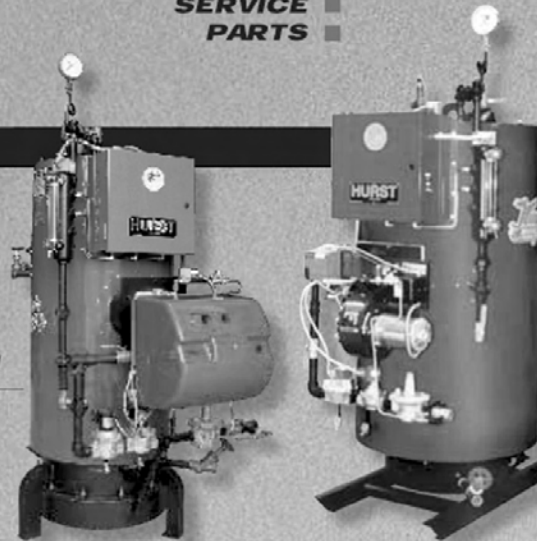
4VT & VIX SERIES

4VT SERIES

Four Pass Vertical Tubeless Design,
6 to 100 HP, 15 to 300# steam, 30 to 160# hot water.
Available with LOW NOx configuration.
Note: 9.5 HP. operator exempt model available.

VIX SERIES (fully submerged tubes)

Vertical fire-tube design features high efficient X-ID Finned Fire-Tubes. Available from 10 to 80 HP.



Use Our CAD Drawings with **PlantSpec®**

hurstboiler.com



200 & 300 SERIES

Two & Three Pass Dry Back Design
15 to 800 HP,
15 to 300# Steam
30 to 160# Hot Water.
Also available with LOW NOx configuration.

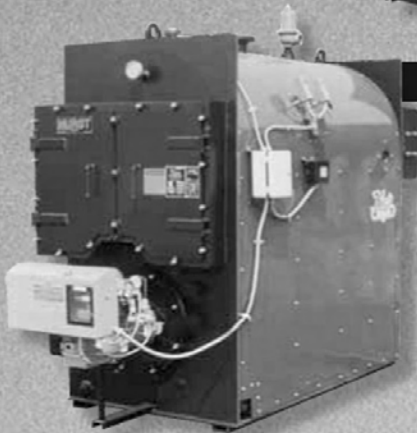
All Hurst Boilers offer extraordinary endurance and dependability. All boilers are designed and built to withstand the severe demands of daily boiler operation. Exceeding the highest of quality standards and rigorous codes such as ASME, IRI, FM, UL CSD-1 and GE-GAP.

LPE & LPW SERIES

Modified Three Pass Scotch Design
 LPE SERIES 20 to 100 HP, 15# steam
 LPW SERIES 30 to 125 HP, 30# hot water
 Available with LOW NOx configuration.



MORE MODELS
 CHOICES
 SOLUTIONS



45 & 100 SERIES

Three Pass Firebox Design, 13.4 to 834 HP, 15# steam,
 30 to 100# hot water. Thickest boiler steel in the industry.
 Available with LOW NOx configuration.

Hurst knows combustion and burns it all... along with our full line of gas, and oil-fired boilers Hurst offers a vast line of coal and solid-fuel fired boilers. Our solid-fuel fired "Hybrid" design has become the leading choice in the forestry related industries.

SOLID FUEL N65 & HYBRID SERIES



Turn-key systems include E.P.A. equipment and solid fuel handling equipment.

- COAL ■
- WOOD ■
- PAPER ■
- BIO-MASS ■

N65 SERIES
 Three-Pass Firebox Design.
 Wet Back Construction.
 100 to 1,500 HP, 15 to 450 PSI.
 Firing options gas, oil or solid fuel stoker.



HYBRID SERIES Multi-Pass Dry Back Design.
 100 to 1,800 HP, 15 to 450 PSI Steam. Solid fuel stoker burns the full spectrum of waste products from all the forest related industries.



OXY-MISER SERIES

Packaged Deaerator systems, 5,000 to 200,000 PPH.
 Conditions feedwater to 0% CO2 and .005cc/liter of oxygen.



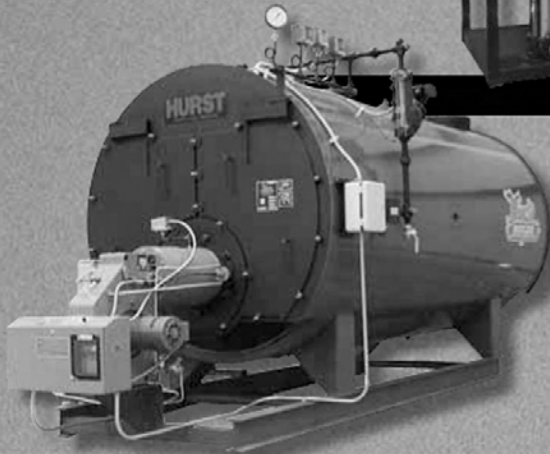
Learn more... hurstboiler.com

FEEDMSER SERIES

Open vented feed water systems.
Fully piped and wired.
Ready to install 30 to 2,000 gallons.
Industrial rated.



MORE MODELS CHOICES SOLUTIONS



OHIO SPECIAL

Three Pass Wet Back Design.
100 to 225 HP.
Extra large furnace for low heat release.
3,347 to 7,762 MBTU/HR.
Available with LOW NOx configuration.

**We Welcome
Custom Design for Solid
Fuel Combustion!**

BOILER PARTS IN STOCK

HURST REPLACEMENT PARTS

Hurst is a major supplier of boiler parts and controls that are commonly found on most boiler systems. Whether gas, oil or solid fuel no matter who the maker. Hurst can fill all your parts needs.

**UPS Overnight
Delivery**

**Pumps
Controls
Gaskets
Valves**

**Burners
Refractory
Fire Bricks
Water Softeners**



**Call Federal for Quotation
and Application assistance**

For More Information

Hurst Boiler continually strives to provide the most comprehensive information and technical product data available via our web site at www.hurstboiler.com

Always visit www.hurstboiler.com for the latest product data, distributor, technical information and literature posting, as well as info on news, events, and specials.

Please visit our site frequently, and be sure to use our CAD drawings or e-mail any of your boiler engineering questions or concerns.

It is always our pleasure to serve you with all your boiler needs.

*Thank you for considering
Hurst Boiler & Welding Company*

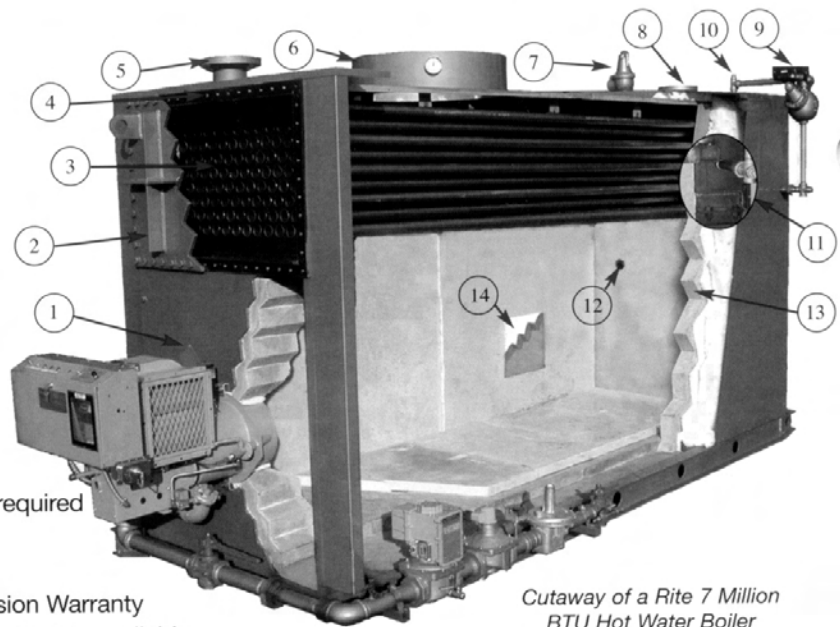
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WATER BOILER ADVANTAGES



- 11-300 Boiler Horsepower
- M.A.W.P. to 160 PSI
- ΔT to 100° F
- Supply Water to 240° F
- No minimum flow rate or flow switch required
- No "runaround" pump required
- ΔP less than 3' head
- 25 Year Thermal Shock and Tube Erosion Warranty
- 80% and 83% maintainable efficiency models available
- Atmospheric or Power Burner Fired



Cutaway of a Rite 7 Million BTU Hot Water Boiler
Power burner fired

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Front firebox inspection viewport. 2. Removable front and rear headplates. Available with hinges for weightless operation. 3. 2" See-through tubes for quick and easy inspection and maintenance. Tubing is non-proprietary and widely available from competitive sources. Replacement costs are many times less than proprietary bent tubes. 4. Headplate flanges are drilled and tapped for smooth gasket surfaces. No flange welded studs to corrode away or | <ol style="list-style-type: none"> interfere with hinged headplates or flange clean-up. 5. Hot water supply connections are ANSI 150# flanged over 2". 6. Round stack outlet with built-in stack supports. Single stacks available on Atmospheric fired boilers up to 7500 MBH input. 7. ASME safety relief valve. 8. Hot water return connection is standard on top for easier field piping and to avoid blocking the rear headplate. 9. Float or probe type low water cut-off. 10. Air elimination fitting. |
|---|--|

NEW FROM RITE

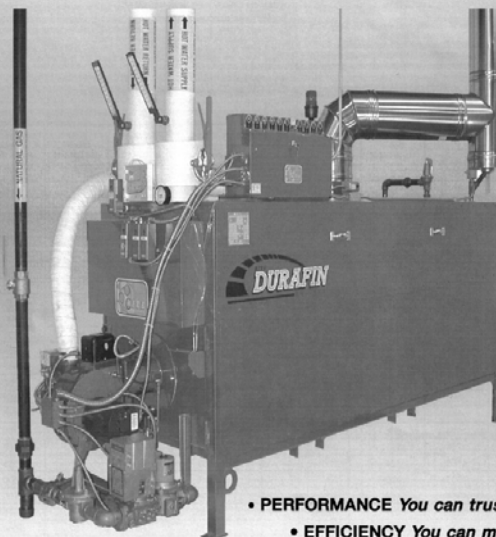
The high efficiency "Bulletproof" hot water boiler



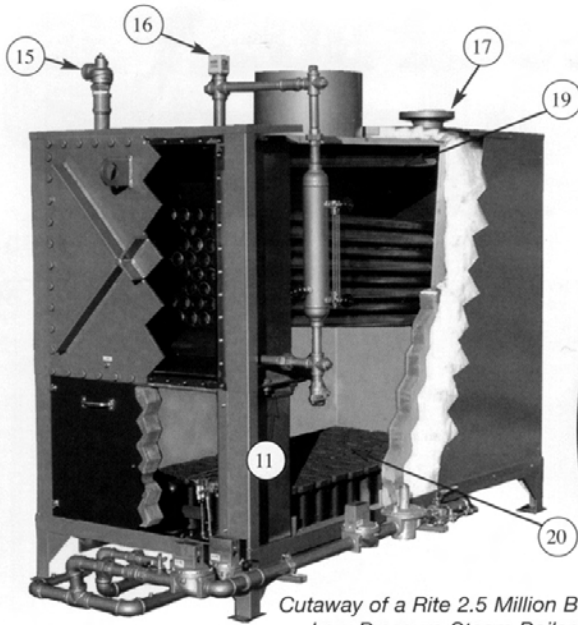
- EASY MAINTENANCE
- LOW NO_x
- SEALED COMBUSTION



(AND OH YEAH...THE HIGHEST NON-CONDENSING EFFICIENCY AVAILABLE)



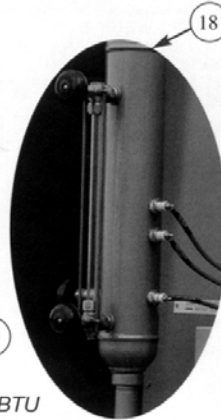
- PERFORMANCE You can trust
- EFFICIENCY You can maintain
- EXPERIENCE You can depend on



Cutaway of a Rite 2.5 Million BTU
Low Pressure Steam Boiler
Atmospheric burner fired

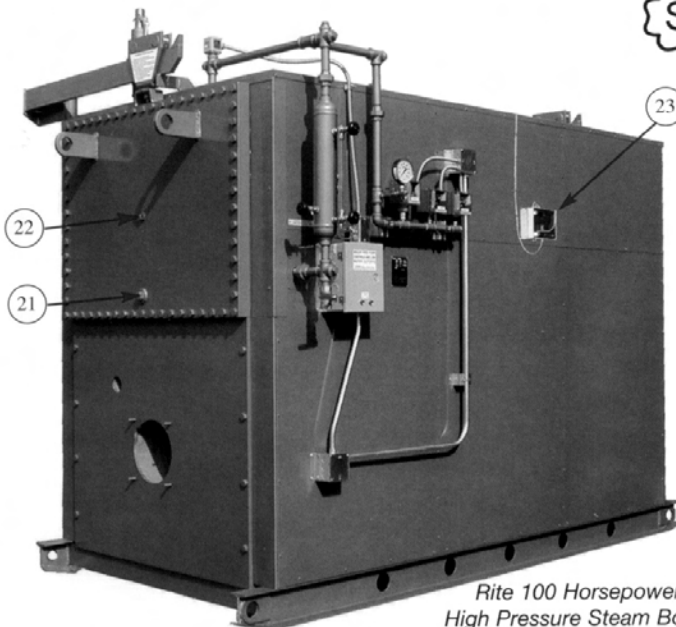


LOW PRESSURE STEAM BOILER ADVANTAGES



- 11-300 Boiler Horsepower
- M.A.W.P. 15 PSI
- Steams in about 5 minutes from a cold start
- 99% Steam Quality under steady load conditions
- No Steam Baffles or Separators required
- Thick Shell and Tubesheet resist corrosion
- Hinged Headplates available for complete and easy waterside access
- 25 Year Thermal Shock Warranty
- Atmospheric or Power Burner Fired
- Nominal 80% *maintainable* efficiency

- | | |
|---|---|
| <ul style="list-style-type: none"> 11. Floating head assembly relieves stress caused by "thermal shock". 12. Rear firebox inspection viewport. 13. Refractory and insulation. 14. Firebox access door. 15. ASME rated pop safety valve. 16. Primary low water cut-off probe. 17. Steam supply. 18. Steam column featuring self-indicating low | <ul style="list-style-type: none"> water cut-off and pump control probes. 19. Steam final pass "superheat" tubes. 20. Heavy duty cast iron upshot burners provide whisper quiet, maintenance free operation. 21. Waterside inspection/blowdown connection. 22. Surface blowdown connection. 23. Draft gauge. 24. Hinged headplate. |
|---|---|



Rite 100 Horsepower
High Pressure Steam Boiler
(Power burner removed
for clarity)



HIGH PRESSURE STEAM & HIGH TEMPERATURE HOT WATER BOILER ADVANTAGES

- 9.5 - 250 Boiler Horsepower
- M.A.W.P. to 325 PSI
- Temperatures to 400°F
- Steams in about 5 minutes from a cold start
- 99% Steam Quality under steady load conditions
- No Steam Baffles or Separators required
- Extra Thick Shell and Tubesheet resist corrosion
- Hinged Headplates available for easy waterside access
- No Handhole or Manhole Assemblies
- 25 Year Thermal Shock Warranty
- Nominal 80% *maintainable* efficiency
- Atmospheric or Power Burner Fired

WWW.RITEBOILER.COM

PEERLESS CAST IRON BOILERS

1

NEW
PRODUCT!

Peerless Boilers PEERLESS® PUREFIRE™

High Efficiency, Gas-Fired Condensing Boiler
Direct Vent, Sealed Combustion

4 Sizes ■ 16 to 140 MBH Input ■ 96% AFUE* ■ Natural or LP Gas

Features:

PUREFIRE™ Boilers are the Most Thoroughly Tested High Efficiency Boilers in the World!

Four Sizes Available; Made in America!

- PF-50 – 16 to 50 MBH Input Modulation
- PF-80 – 26 to 80 MBH Input Modulation
- PF-110 – 36 to 110 MBH Input Modulation
- PF-140 – 46 to 140 MBH Input Modulation

State-of-the-Art Control Board Features

- Outdoor Reset and Domestic Hot Water Priority
- LCD Status Display Module Features Plain English, Easy-to-Read Status and Troubleshooting Text
- System Test Mode for Manual Control of Firing Rate
- Energy Saving Heat Recovery Function Improves Domestic Hot Water Performance and Reduces Off Cycle Losses
- Standby Temperature of Domestic Hot Water is Controlled by Economic Low Fire Operation

Fully Modulating Burner for Maximum Efficiency

- 3 to 1 Flame Modulation Assures Dependable Operation and Increases Boiler Efficiency
- Dual Flame Sensing to Promote Reliable Firing and Safe Operation
- Uses Standard Schedule 40 PVC Plastic Pipe for Venting

Condensate System

- Built-in Neutralizer System with Float Switch Protection

Other Great Features!

- All PUREFIRE Boilers Have ASME and ETL Approvals for U.S. and Canada
- Environmentally Friendly, Low Emissions with a Rating of Less than 30PPM LoNOx. Exceeds National as well as Stringent Southern California Standards
- Sleek, Modern Design with Easy to Access Controls and Visible System/Boiler Monitoring
- High Grade Stainless Steel Burner and Heat Exchanger
- Compact, Lightweight, Small Footprint
- Zero Clearance to Combustibles - Allows for Maximum Installation Flexibility
- Blocked Flue and Heat Exchanger Sensors for Safe Operation
- 120 Volt Convenience Outlet
- Leveling Legs to Insure Proper Installation and Condensate Removal
- Sealed Cabinet Prevents Combustion Noises and Odors

*Actual reading: 95.85% AFUE

A Complete
Warranty
Program!



As an ENERGY STAR® Partner, PB Heat, LLC has determined that this product meets the ENERGY STAR® guidelines for energy efficiency.

Standard Equipment:

- One Year Parts and Labor Warranty
- Factory Tested Pre-Mixed Gas Burner Technology
- Built-in Condensate Neutralizer System with Float Switch
- Combination Temperature-Pressure Gauge and 30 PSIG Relief Valve Along with the Required Piping Tees for Proper Mounting
- PVC Screened Air Intake and Exhaust Terminals
- Outdoor Sensor
- Leveling Legs

Optional Equipment:

- Concentric PVC, Polypropylene or Stainless Steel Vent Termination Kits
- Wall Mounting Kit
- Floor Mounted Steel Boiler Stand
- Domestic Water Tank Sensor
- 50 PSIG Relief Valve
- Accessories and Repair Parts Readily Available
- Low Water Cut-Off

We are pleased to offer one of the most comprehensive warranty programs in the industry. The Peerless PUREFIRE condensing boiler carries a full one-year warranty on the entire boiler. We will also purchase an additional warranty that covers labor for replacing warranted parts from the 31ST day through the first year after installation, provided the warranty registration card is returned. In addition, we offer a limited, pro-rated, 12-year warranty on the heat exchanger of the PUREFIRE boiler. **Five and ten-year extended warranties on parts and labor may also be purchased.** This summary is not a specific warranty. Please consult us for complete warranty information.



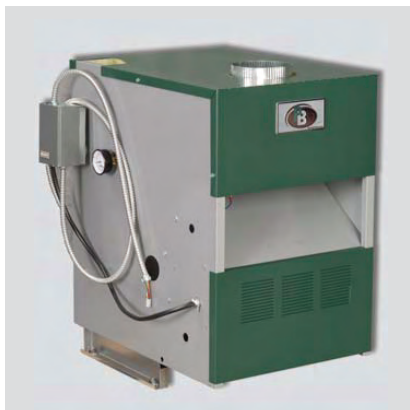
PeerlessBoilers.com

PEERLESS CAST IRON BOILERS

Series MI/MIH

1

Type: Residential
Construction: Cast Iron
Fuel: Gas-Fired (MI - Natural or LP; MIH - Natural)
Input: 65 to 260 MBH
Output: 54 to 211 MBH Gross
Venting: Natural Draft
Trim: Water
Ignition: MI - Standing Pilot or Intermittent;
MIH - Intermittent



- Packaged Residential Hot Water Boilers
- Natural or LP Gas
- Natural Draft (Chimney) Venting
- Standing Pilot or Intermittent Ignition
- Low Profile Design
- Steel Push Nipples

Series 64



Type: Semi-Commercial
Construction: Cast Iron
Fuel: Gas-Fired (Natural or LP)
Input: 345 to 632.5 MBH
Output: 279 to 525 MBH Gross
Venting: Natural Draft
Trim: Water or Steam
Ignition: Spark Ignition (Standing Pilot Ignition standard on 64-07 & 64-08 models)

- Packaged or Knockdown Gas Boiler
- Natural or LP Gas
- Natural Draft (Chimney) Venting
- Single Vent Draft Hood
- Standing Pilot or Spark Ignition



PEERLESS CAST IRON BOILERS

Series 211A

1

Type: Commercial
Construction: Cast Iron
Fuel: Gas-Fired (Natural or LP)
Input: 630 to 9,450 MBH⁵
Output: 504 to 7,560 MBH Gross
Venting: Natural Draft
Trim: Water or Steam
Ignition: Standing Pilot or Spark



- Commercial Atmospheric Gas Boiler
- Packaged, Assembled Block (to 19 Sections Only) or Individual Sections
- Natural Draft (Chimney) Venting
- 630 to 9,450 MBH Input⁵
- Steam or Hot Water Boilers
- Natural or LP Gas

Series LC/LCE

Type: Commercial
Construction: Cast Iron
Fuel: Gas, Oil, Gas/Oil-Fired
Input: 686 to 4,663 MBH
Output: 547 to 3,777 MBH Gross
Venting: Forced Draft
Trim: Water or Steam
Ignition: Power Burner



- Large Commercial
- Packaged Assembled Block or Individual Sections
- Forced Draft Venting
- Power Burner — Oil, Gas, Gas/Oil
- Steam or Hot Water Boilers
- Optional Tankless Coils

PEERLESS CAST IRON BOILERS

Peerless® Partner®

1

Type: Indirect-Fired Water Heater
Construction: Stainless Steel Tank/Maintenance Free Plastic Jacket
Fuel: Indirect-Fired
Storage Capacity: 30 to 119 Gallons
First Hour Ratings: 169 to 423 Gallons @ 140°
 234 to 564 Gallons @ 115°



- Five (5) Sizes
- Modern Coil Design
- Minimal Standby Temperature Loss
- Rapid Recovery Rate
- Long Lasting Stainless Steel Construction
- Easy Installation
- No Separate Chimney or Burner Needed

Peerless® Partner® Ratings						
Model Number	Storage Capacity	Pressure		Heat Exchange Surface	First Hour Ratings*	
		Test	Working		@140°	@115°
PP-30	30 gallons	300 PSI	150 PSI	15 sq. ft.	169 gallons	234 gallons
PP-40	37 gallons	300 PSI	150 PSI	20 sq. ft.	212 gallons	292 gallons
PP-60	57 gallons	300 PSI	150 PSI	20 sq. ft.	266 gallons	370 gallons
PP-80	77 gallons	300 PSI	150 PSI	34 sq. ft.	330 gallons	440 gallons
PP-120	119 gallons	300 PSI	150 PSI	34 sq. ft.	423 gallons	564 gallons
PP-40DW	37 gallons	300 PSI	150 PSI	20 sq. ft.	110 gallons	152 gallons
PP-60DW	57 gallons	300 PSI	150 PSI	20 sq. ft.	126 gallons	174 gallons
PP-80DW	77 gallons	300 PSI	150 PSI	20 sq. ft.	160 gallons	221 gallons
PP-120DW	119 gallons	300 PSI	150 PSI	20 sq. ft.	296 gallons	414 gallons

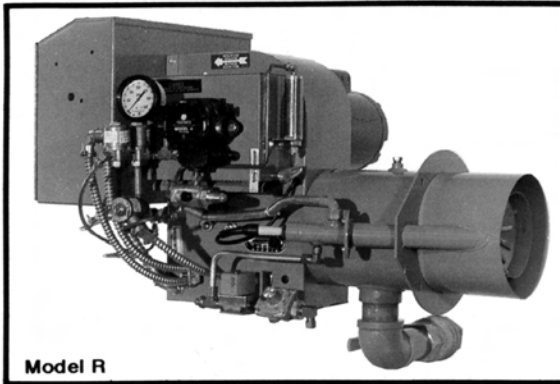
*Based on 90° F rise, 55°/145° with 180° F boiler water. First hour rating is only one factor in product selection. Refer to Installation Instructions for additional information.



GORDON-PIATT BURNERS

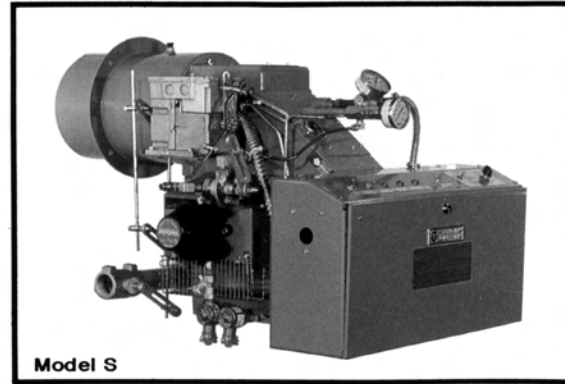
Burners for all your combustion needs.

1



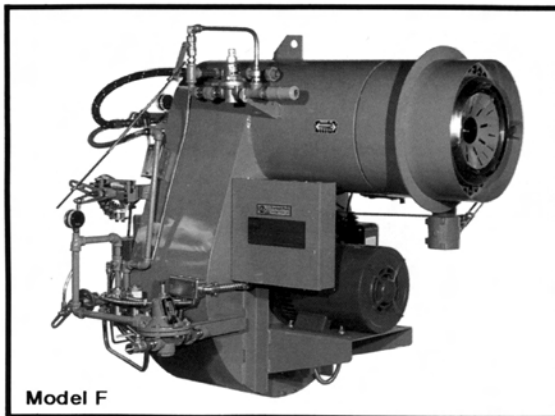
Model R

The R Model is most commonly used with firebox boilers and other applications with firebox pressures not exceeding .075 inches water column. It can fire oil and gas either singly or in combination, and is available in 12 different capacity ratings.



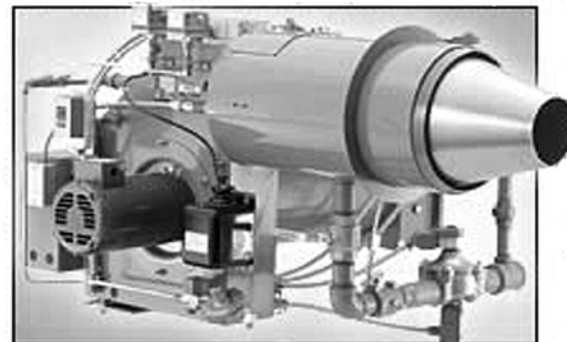
Model S

The S Model is most commonly used with Scotch marine boilers and other applications with firebox pressures up to 2.0 inches water column. It has a low profile to allow for clearance immediately above the center line of the firing head. Like the R Model, it can fire oil and gas either singly or in combination. It is available in 12 different capacity ratings.



Model F

The F Model is our most versatile burner. It can fire No. 2 through No. 6 fuel oil and a variety of gases either singly or in combination. It can be applied to most any application, and the larger models can be used with firebox pressures of up to 6 inches water column. It is available in over 40 capacity ratings.



The Model Z is the newest burner. It uses state-of-the-art design developed with Computational Fluid Dynamics to achieve ultra-low NOx and energy-saving performance. It has a wide operating envelope and can be used in fire-tube, water-tube and cast iron boilers, incinerators and other applications.

Design Capabilities by Model

Complete Engineering Data is available upon request

Model	Input Range BTU/hr. X 1000	Boiler Horsepower	Fuels Burned		Oil Atomization		
			Oils	Gases	Pressure	Air	Steam
F	3650-33600	80-800	All	All	x	x	x
R	400-8100	10-190	No. 2	All	x		
S	400-12600	10-300	No. 2	All	x		
Z	200-5250	9-125	No. 2	All	x		

Overall Capabilities

3 to 1,050 boiler horsepower - 100,000 to 42,000,000 BTU/hr. input

Fuels Burned		
Gases	Oils	Combinations
Natural	No. 2	Gas-oil
LP	No. 4	Gas-gas
Mixed	No. 5	Fuel changeover by flick of a switch or automatically
Digester	No. 6	

For more information,
visit www.gordon-piatt.com.



LAARS and Federal

Laars – where water and heat meet each other very efficiently

Laars was started in 1948 in California by Avy Miller, who discovered he could heat water quickly and efficiently with finned copper tubing heaters. His first application was in heating swimming pool water. As the units proved their worth in pool water (which had dirt, chemicals, and other contaminants), Laars asked, “Why not use them in cleaner closed loop hydronic heating applications and domestic hot water?” These lower cost heaters found a ready market. Laars also discovered that scale build-up could be eliminated through the high velocity flow of water. Thus, the low mass application of water heating came into its own.

Federal has been Oklahoma’s Laars rep for 25 of their 60 years. Laars units have been successfully applied in both hydronic heating and domestic hot water heating all over Oklahoma – in locations as varied as hotels, apartments, restaurants, dormitories, and industrial applications.

The following pages illustrate some of the many Laars products available. Their web site is a treasure of additional information. Note: we stock many popular heaters and tanks. We have learned how to properly apply these units both in quick change-outs and in new construction jobs. Let us help you solve your water heating challenges!



View our entire product line at www.Laars.com

LAARS HEATING SYSTEMS

1

LAARS® NEOTHERM® HYDRONIC BOILER

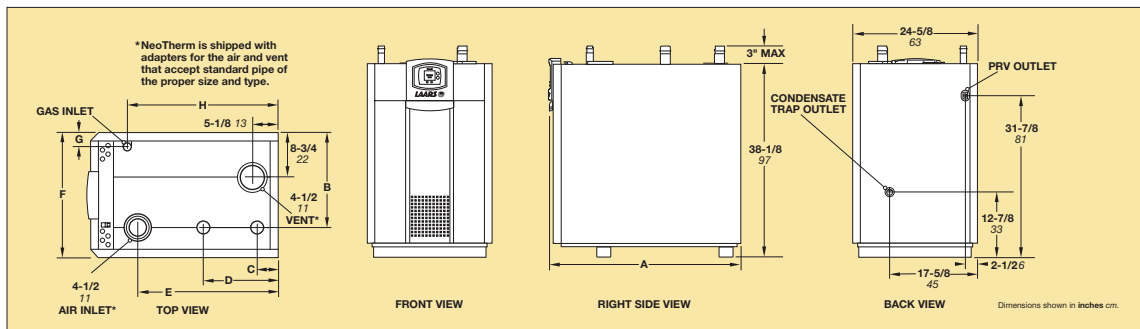


NeoTherm Features:

- Floor-standing condensing boiler
- All connections are on top of unit
- Stainless steel heat exchanger
- Rated for alcove and closet installations
- Easy to service
- Will qualify for Energy Rebates
- Low NOx emissions, 90+% AFUE
- LAARS Integrated Control SystemSM
- Works with BAS

Standard Equipment:

- High condensing efficiency
- Modulation down to 20% of full fire (5:1 turndown)
- Sealed combustion chamber
- Pre-mix stainless steel burner
- Low NOx system exceeds the most stringent regulations for air quality
- Horizontal or vertical direct vent
- Horizontal vent and air terminals
- Vent and air pipe lengths of up to 100 equivalent feet (each)
- Built-in condensate trap
- Vent temperature cutoff feature
- Spark ignition system
- 160 psi maximum working pressure
- Stainless steel heat exchanger with welded construction (no gaskets)
- ASME "H" stamp
- Boiler circulator, mounted and wired inside jacket
- 75 psi (517 kPa) ASME rated pressure relief valve
- Temperature & pressure gauge
- Drain valve
- Multiple pump control for boiler pump, system pump and indirect domestic water pump, each with delay
- Electronic PID modulating control with real-time data trending analysis
- Large user-interface and display
- Diagnostics displayed in text form
- Alarm output
- Selector switch for internal or external (4-20mA) modulation control
- Indirect water heater priority (sensor sold separately)
- Outdoor reset (sensor sold separately)
- On/off toggle switch
- Manual reset high limit
- Air pressure switch
- Burner site glass
- Zero clearance to combustible surfaces
- 12 year warranty

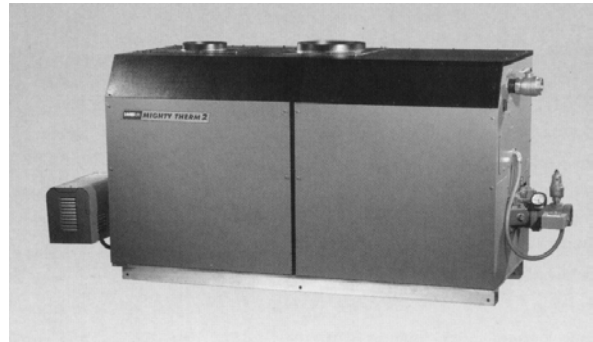


Laars® NeoTherm®

Model Number	Input		Output		A	B	C	D	E	F	G	H
	BTU/h	kW	BTU/h	kW	in. cm.	in. cm.	in. cm.	in. cm.	in. cm.	in. cm.	in. cm.	in. cm.
NT-285	285,000	83.5	285,000	83.5	26 ⁵ / ₈ 68	18 ¹ / ₂ 47	5 ³ / ₄ 15	14 36	17 ³ / ₄ 45	19 ¹ / ₈ 49	14 36	20 ⁷ / ₈ 51
NT-399	399,000	116.9	399,000	116.9	31 ¹ / ₂ 80	18 ⁵ / ₈ 47	4 ¹ / ₈ 11	14 ⁵ / ₈ 37	21 ⁵ / ₈ 54	19 48	19 ¹ / ₄ 49	25 64
NT-500	500,000	146.5	500,000	146.5	37 ³ / ₄ 96	18 ³ / ₄ 48	4 ¹ / ₈ 11	14 ⁷ / ₈ 38	27 ⁵ / ₈ 70	19 48	2 ³ / ₄ 7	29 ³ / ₄ 76

LAARS HEATING SYSTEMS

Laars perfected the “Mighty Therm” over the last 40 years. It has been the “workhorse” of the copper tube heaters. Building on that successful platform, the **Mighty Therm2** offers the same strong features plus increased efficiencies, low NOx burner, and ducted combustion – all with easy maintenance. Federal stocks the most popular sizes.



1

INTRODUCING...

MIGHTY THERM2

Mighty Therm2 Features:

- Applications for hydronic heating or domestic hot water
- 85% Combustion efficiency, 84% Thermal efficiency
- NOx below 10 ppm
- 2-Stage firing
- Immune to thermal shock down to 30°F
- Operates in altitudes up to 10,000 feet
- Ambient temperatures from -40°F to +140°F
- Tolerant of glycol systems
- Waterways able to operate in a maximum water hardness of 17 gpg
- Hydronic models supply temps from 130°F to 240°F
- Volume water heater models supply temps from 130°F to 200°F
- Gas supply right or left side (field convertible)
- Maintains efficiency and low NOx levels at low and high fire
- Optional factory-mounted pump sized for heat exchanger, 30 feet of pipe and 3 elbows total pressure drop
- Fan-assisted combustion system
- 120vac, 60 Hz single phase power
- External staging control connections
- May be ordered with left or right-hand piping connection

Extremely durable construction

- Modular construction: burner trays, gas train, blower assembly
- Glass-lined cast iron or bronze headers
- Heat exchanger uses efficient 10 finned-tube design
- Lightweight insulation
- Compliant end-walls to accommodate thermal expansion
- Non-ferrous waterways to meet standards for volume water heaters
- Backed by LAARS warranty and superior customer service

Extremely flexible venting

- Category III (horizontal) venting, up to 50 feet with 3 elbows, without additional fans
- Fan-assisted category I venting with standard B-vent
- Combustion air can be taken from room, or ducted to the unit from the outside

Extremely easy maintenance

- Heat exchanger is removable from top, back or front
- Washable air filter
- Wiring terminal strip makes electrical troubleshooting easy
- Easy access to ignitor via special service panel
- Easy-to-service burner assembly

LAARS HEATING SYSTEMS

1

Mighty Therm2 Sizing Data

Size	Input BTU/Hr.	Output BTU/Hr.	Gas Connection Sizes inches	Water Connection Sizes inches	Approx. Shipping Weight* lbs. kg
500	500,000	425,000	1 1/4	2	425 193
750	750,000	638,000	1 1/4	2	505 229
1000	999,000	849,000	1 1/4	2 1/2	615 279
1250	1,250,000	1,062,500	2	2 1/2	675 306
1500	1,500,000	1,275,000	2	2 1/2	760 345
1750	1,750,000	1,487,500	2	2 1/2	825 375
2000	1,999,000	1,699,000	2	2 1/2	955 434

- NOTE:** 1. Input and output must be derated 4% per 1000 feet above sea level when installed above 2000 feet altitude.
 2. Dimensions are nominal.
 3. For other boiler ratings: Boiler Horsepower: $HP = \frac{Output}{33,475}$ Radiation Surface: $EDR \text{ sq. ft.} = \frac{Output}{150}$

*Add approximately 55 lbs. (25 kg) for pump-mounted units.

MT2H (Boiler) Temperature Rises in Degrees

Size	20°F		11°C		25°F		14°C		30°F		17°C		35°F		19°C	
	Flow GPM	H/L Feet	Flow lpm	H/L m	Flow GPM	H/L Feet	Flow lpm	H/L m	Flow GPM	H/L Feet	Flow lpm	H/L m	Flow GPM	H/L Feet	Flow lpm	H/L m
500	43	1.7	161	0.5	34	1.1	129	0.3	28	0.9	107	0.3	24	0.7	92	0.2
750	64	3.3	242	1.0	51	2.3	193	0.7	43	1.7	161	0.5	36	1.2	138	0.4
1000	85	5.0	321	1.5	68	3.6	257	1.1	57	3.1	214	0.9	49	2.2	184	0.7
1250	106	8.1	402	2.5	85	6.1	322	1.9	71	4.7	268	1.4	61	3.4	230	1.0
1500	128	10.0	483	3.0	102	7.2	386	2.2	85	5.5	322	1.7	73	4.2	276	1.3
1750	N/R	N/R	N/R	N/R	119	10.5	451	3.2	99	8.4	375	2.6	85	5.8	322	1.8
2000	N/R	N/R	N/R	N/R	136	12.5	515	3.8	113	10.4	429	3.2	97	8.3	368	2.5

MT2V (Water Heater)

Size	HARD WATER						NORMAL WATER						SOFT WATER					
	Flow GPM	H/L Feet	Temp. Rise °F	Flow lpm	H/L m	Temp. Rise °C	Flow GPM	H/L Feet	Temp. Rise °F	Flow lpm	H/L m	Temp. Rise °C	Flow GPM	H/L Feet	Temp. Rise °F	Flow lpm	H/L m	Temp. Rise °C
500	90	3.5	9	341	1.1	5	68	2.3	13	257	0.7	7	45	1.8	19	170	0.5	10
750	90	6.0	14	341	1.8	8	68	3.0	19	257	0.9	10	45	2.1	28	170	0.6	16
1000	90	6.1	19	341	1.9	10	68	3.6	25	257	1.1	14	45	2.3	38	170	0.7	21
1250	90	6.3	24	341	1.9	13	68	3.8	31	257	1.2	17	68	3.8	31	257	1.2	17
1500	90	6.5	28	341	2.0	16	68	3.9	38	257	1.2	21	68	3.9	38	257	1.2	21
1750	90	6.7	33	341	2.0	18	68	4.0	44	257	1.2	24	68	4.0	44	257	1.2	24
2000	120	10.0	30	424	3.0	17	112	10.0	30	424	3.0	17	112	10.0	30	424	3.0	17

NOTE: Headloss (H/L) shown is for the Mighty Therm2 heat exchanger only.

Recovery Data Temperature Rises in Degrees

Size	40°F gph	22°C L/h	50°F gph	28°C L/h	60°F gph	33°C L/h	70°F gph	39°C L/h	80°F gph	44°C L/h	90°F gph	50°C L/h	100°F gph	56°C L/h	120°F gph	67°C L/h	140°F gph	78°C L/h
500	1276	4821	1020	3857	850	3214	729	2755	638	2411	567	2143	510	1929	425	1607	364	1378
750	1915	7238	1532	5790	1277	4825	1094	4136	957	3619	851	3217	766	2895	638	2413	547	2068
1000	2548	9632	2038	7705	1699	6421	1456	5504	1274	4816	1132	4281	1019	3853	849	3211	728	2752
1250	3189	12054	2551	9643	2126	8036	1822	6888	1594	6027	1417	5357	1276	4821	1063	4018	911	3444
1500	3827	14464	3061	11571	2551	9643	2187	8265	1913	7232	1701	6429	1531	5786	1276	4821	1093	4133
1750	4464	16875	3571	13500	2976	11250	2551	9643	2232	8438	1984	7500	1786	6750	1488	5625	1276	4821
2000	5099	19274	4079	15419	3399	12850	2914	11014	2550	9637	2266	8566	2040	7710	1700	6425	1457	5507

NOTE: gph = gallons per hour, L/h = Liters per hour.

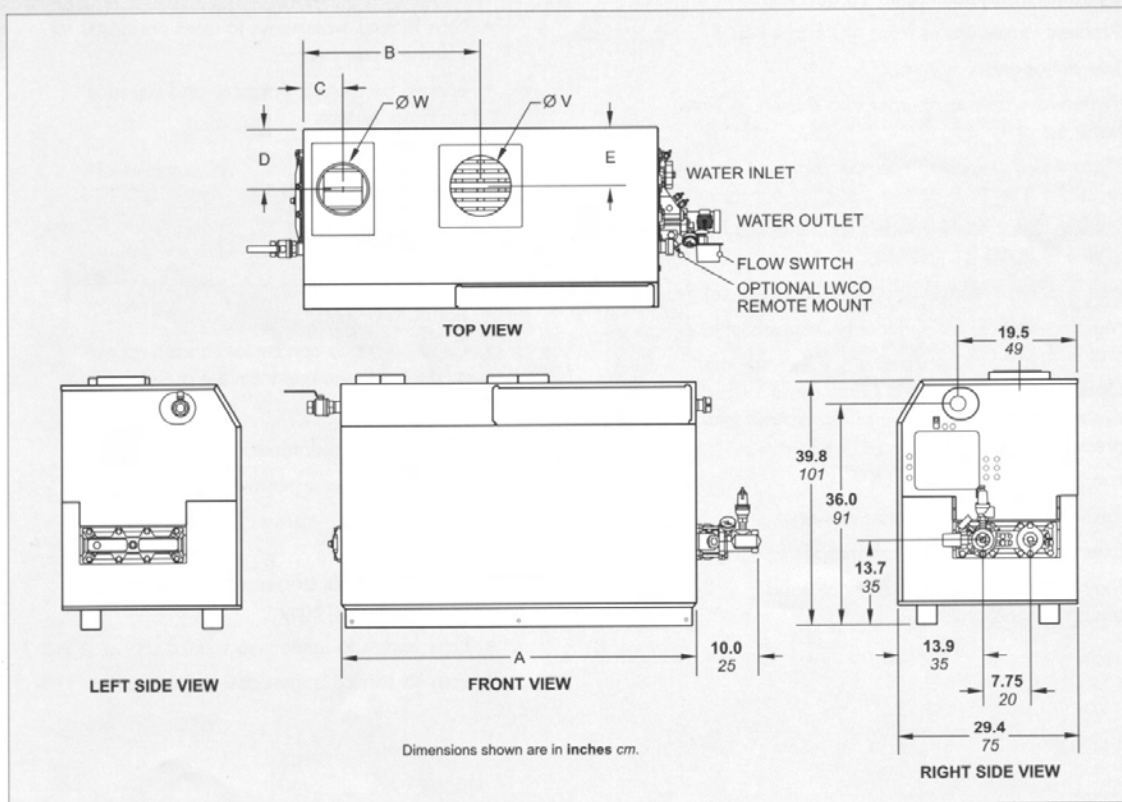
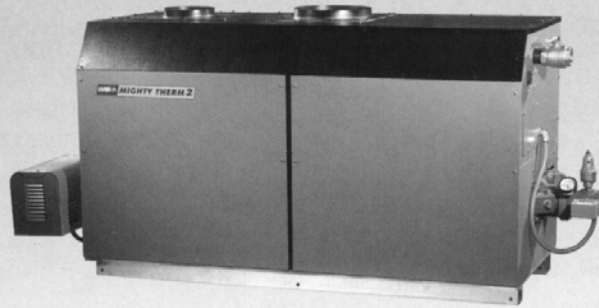
Electrical Data

Model	Boiler/Heater			Pump Delay Connection Rating			Blower(s)
	Volts	Phase	Amps	Volts	Phase	Amps	
MT2H, MT2V non- pump mounted 500-2000	115	Single	Less Than 12	Pilot Duty 24V	Single	Up to 25VA	Included in MT2 connection

LAARS HEATING SYSTEMS

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MIGHTY THERM2



Dimensions

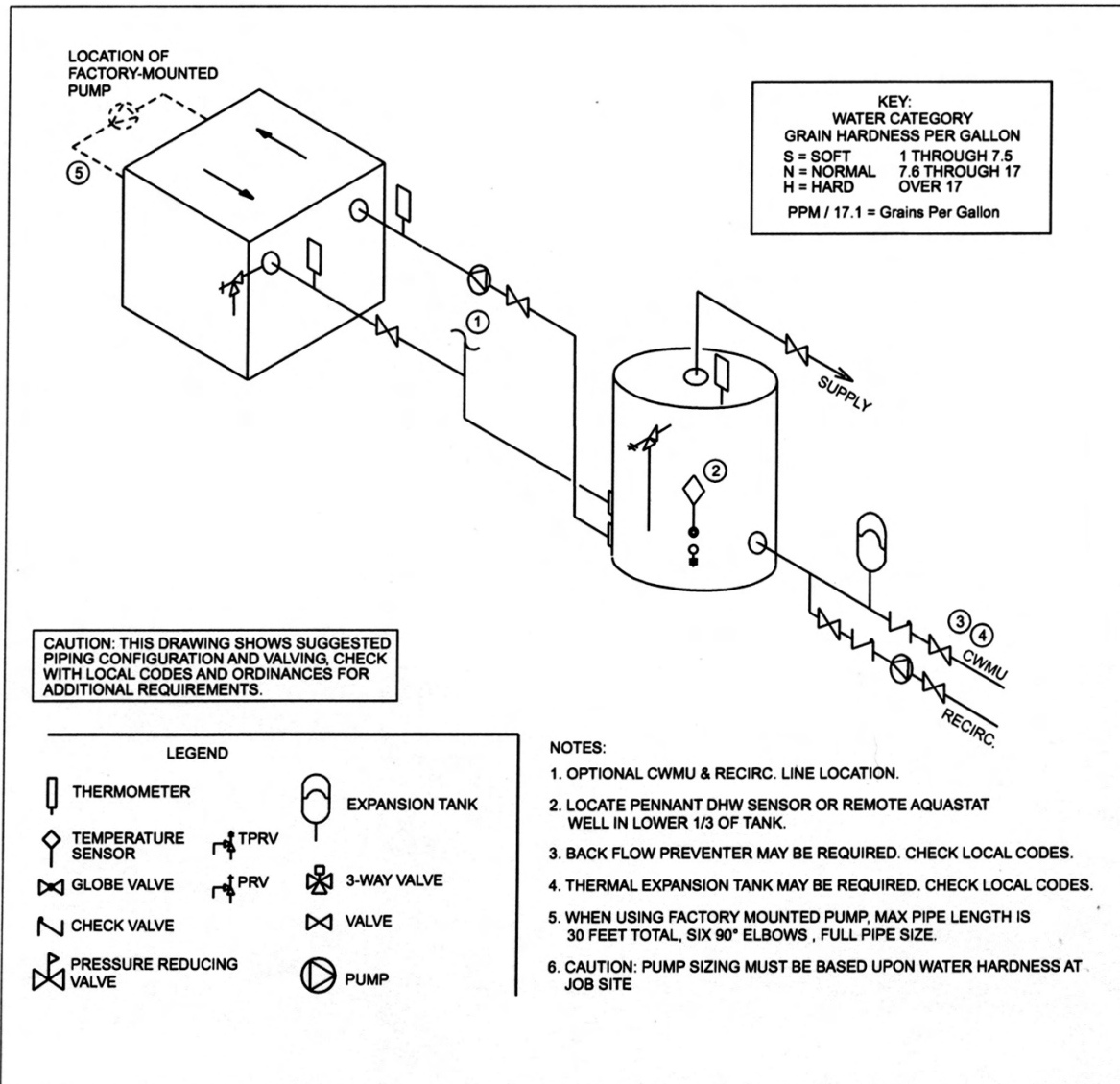
Size	A		B		C		D		E		Air Conn. W		Vent Conn. V	
	in	cm	in	cm	in	cm	in	cm	in	cm	in	cm	in	cm
500	33 ³ / ₄	85	16 ³ / ₄	43	6 ¹ / ₂	17	10	25	8	20	6	15	8	20
750	45 ³ / ₄	116	22 ³ / ₄	53	6 ¹ / ₂	17	10	25	9 ¹ / ₂	24	6	15	10	25
1000	57 ³ / ₄	147	28 ³ / ₄	73	6 ¹ / ₂	17	10	25	9 ¹ / ₂	24	8	20	10	25
1250	68 ¹ / ₄	173	34	87	10 ¹ / ₄	26	10	25	9	23	8	20	12	30
1500	78 ³ / ₄	200	39 ¹ / ₂	100	10 ¹ / ₄	26	10	25	9	23	8	20	12	30
1750	89 ¹ / ₄	227	44 ³ / ₄	113	10 ¹ / ₄	26	10	25	9	23	8	20	14	36
2000	99 ³ / ₄	253	49 ³ / ₄	127	10 ¹ / ₄	26	10	25	9	23	12	30	14	36

NOTE: Dimensions shown in inches cm.

LAARS HEATING SYSTEMS

DOMESTIC HOT WATER APPLICATIONS

1



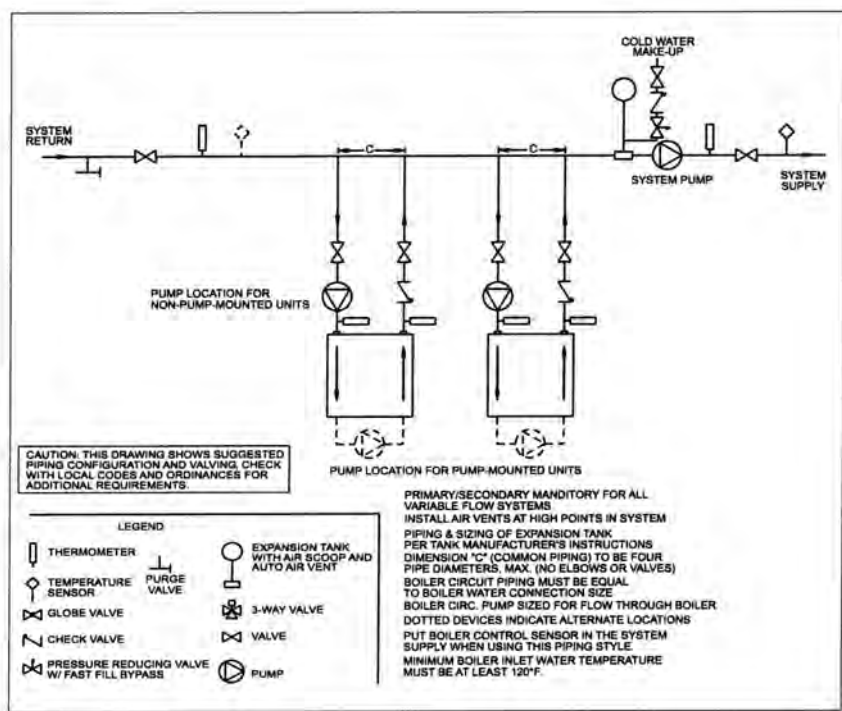
Representative DHW Heater Piping

LAARS HEATING SYSTEMS

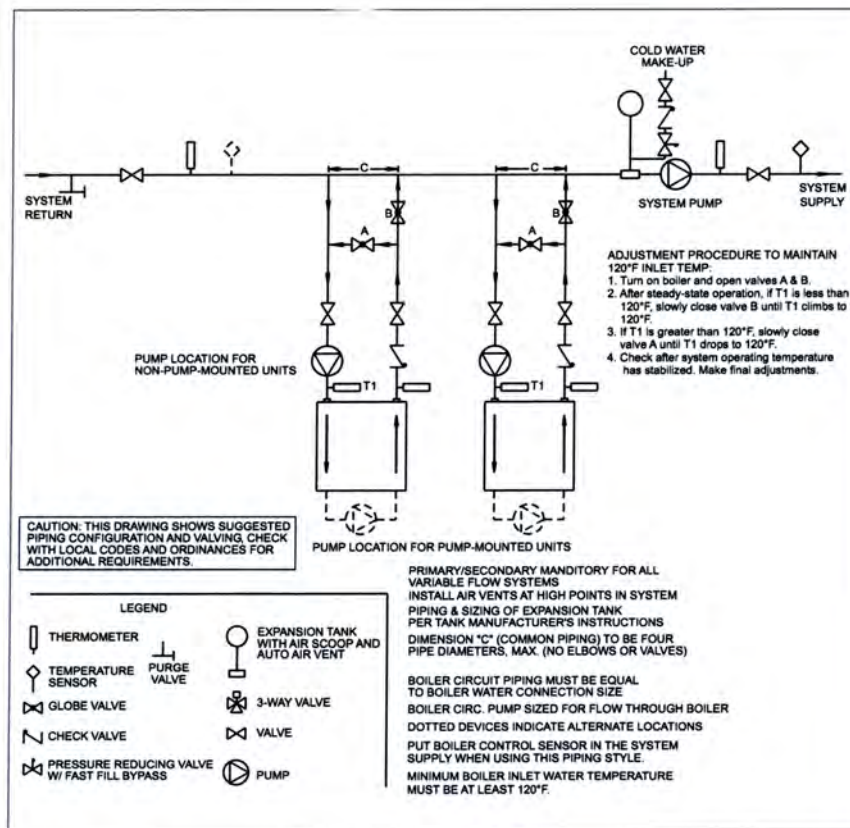
CLOSED LOOP HYDRONIC APPLICATIONS

1

Representative Hydronic Piping—Multiple Boilers, Primary Secondary System



Representative Hydronic Piping—Multiple Boilers, Low Temperature System (Water Source Heat Pump Application)

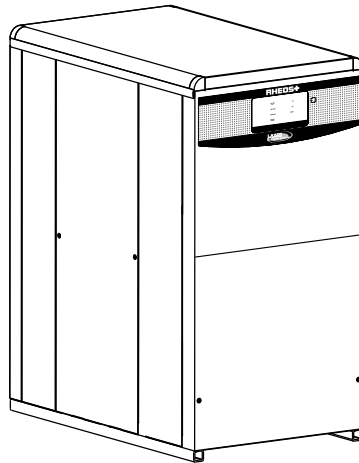


LAARS HEATING SYSTEMS

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RHEOS+

- * Fully Modulating
- * Fully Condensing
- * Sealed Combustion
- * Low NO_x
- * Up to 98% Efficient



Condensing Boiler and Water Heater

RHHH	Hydronic Boiler
RHHV	Volume Water Heater

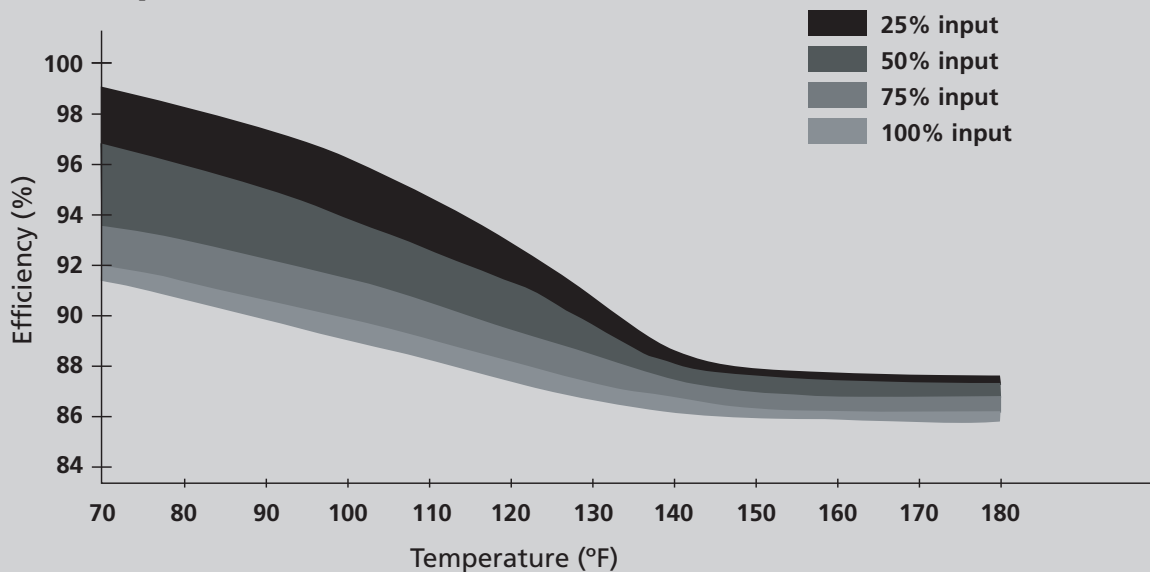
Submittal Data **LAARS**
Heating Systems Company

Specifications*

Model (size)	1200		1600		2000		2400	
Input, High Fire	1,200 MBTU/h	352 kW	1,600 MBTU/h	469 kW	2,000 MBTU/h	586 kW	2,400 MBTU/h	703 kW
Output, High Fire	1,080 MBTU/h	316 kW	1,440 MBTU/h	422 kW	1,800 MBTU/h	527 kW	2,160 MBTU/h	633 kW
Input, Low Fire	300 MBTU/h	88 kW	400 MBTU/h	117 kW	500 MBTU/h	146 kW	600 MBTU/h	176 kW
Output, Low Fire	270 MBTU/h	79 kW	360 MBTU/h	105 kW	450 MBTU/h	132 kW	540 MBTU/h	159 kW
Vent Size (Cat. IV)	6"	15 cm	6"	15 cm	7"	18 cm	10"	25 cm
Combustion Air Size	6"	15 cm	8"	20 cm	8"	20 cm	8"	20 cm
Electrical- Control Circuit	120V / single phase / 20A		120V / single phase / 20A		120V / single phase / 20A		120V / single phase / 20A	
Electrical- Pump Circuit	230V / single phase / 20A		230V / single phase / 20A		230V / single phase / 20A		230V / single phase / 20A	
Shipping Weight	1420 lbs	645 kg	1465 lbs	666 kg	1495 lbs	678 kg	1550 lbs	704 kg

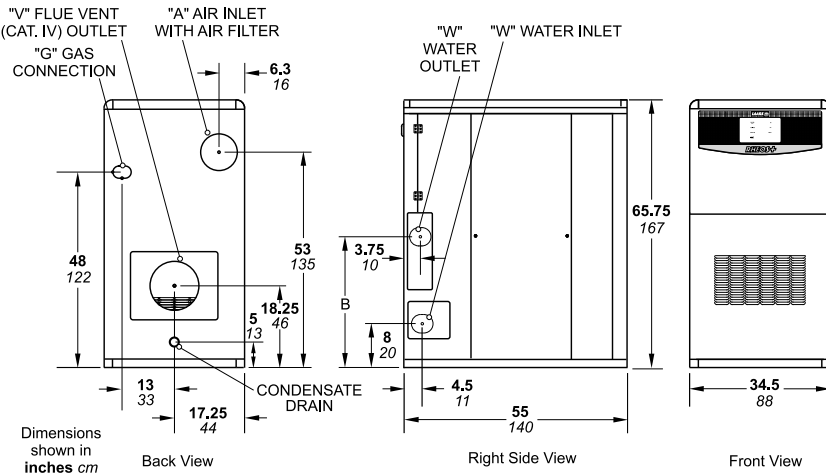
*Important Note: output shown is calculated using a 90% combustion efficiency. The efficiency of this unit will increase with lower return water temperature and/or lower modulation point, which will alter the output of the Rheos+.

Efficiency Curve



LAARS HEATING SYSTEMS

Dimensions



1

Model	"V" Vent Outlet Connection		"A" Air Inlet Connection		"W" Inlet / Outlet Water Connection NPT	"G" Gas Connections Control Packages			"B"	
	in.	cm	in.	cm		Std & A Nat / LP NPT	B & E Nat NPT	B & E LP NPT	in.	cm
						1"	1-1/2"	2"		
1200	6	15	6	15	2-1/2"	1"	1-1/2"	1-1/2"	34-1/4	87
1600	6	15	8	20	2-1/2"	1-1/2"	2"	2"	34-1/4	87
2000	7	18	8	20	3"	1-1/2"	2"	2"	34-1/4	87
2400	10	25	8	20	3"	1-1/2"	2"	2"	32	81

Water Flow

RHHH (Boiler)
TEMPERATURE RISE IN DEGREES

Model Size	20°F	11°C	25°F	14°C	30°F	17°C
	Flow gpm	Flow lpm	Flow gpm	Flow lpm	Flow gpm	Flow lpm
1200	108	409	86	327	72	273
1600	144	545	115	436	96	363
2000	180	681	144	545	120	454
2400	216	818	173	654	144	545

RHHV (Water Heater)

Model Size	HARD WATER				NORMAL WATER				SOFT WATER			
	Flow gpm	Temp Rise °F	Flow lpm	Temp Rise °C	Flow gpm	Temp Rise °F	Flow lpm	Temp Rise °C	Flow gpm	Temp Rise °F	Flow lpm	Temp Rise °C
1200	108	20	409	11	86	25	327	14	72	30	273	17
1600	169	17	641	9	137	21	519	12	93	31	352	17
2000	189	19	717	11	157	23	593	13	103	35	389	19
2400	216	20	818	11	173	25	654	14	144	30	545	17

NOTE: Soft water: 1 to 7.5 grains per gallon. Normal water: 7.6 to 17 grains per gallon. Hard water: More than 17 grains per gallon.
*Important Note: water flow shown is calculated using a 90% combustion efficiency. The efficiency of this unit will increase with lower return water temperature and/or lower modulation point, which will lead to varying temperature rise.

Minimum Recovery Table*

GPH L/h Delivered
REQUIRED WATER TEMPERATURE RISE °F / °C

Model Size	40°F	22°C	50°F	28°C	60°F	33°C	70°F	39°C	80°F	44°C	90°F	50°C	100°F	56°C	120°F	67°C	140°F	78°C
	GPH	L/h	GPH	L/h	GPH	L/h	GPH	L/h	GPH	L/h	GPH	L/h	GPH	L/h	GPH	L/h	GPH	L/h
1200	3241	12252	2593	9802	2161	8168	1852	7001	1621	6126	1441	5445	1297	4901	1080	4084	926	3501
1600	4322	16336	3457	13069	2881	10891	2470	9335	2161	8168	1921	7261	1729	6534	1441	5445	1235	4667
2000	5402	20420	4322	16336	3601	13613	3087	11669	2701	10210	2401	9076	2161	8168	1801	6807	1543	5834
2400	6483	24504	5186	19603	4322	16336	3704	14002	3241	12252	2881	10891	2593	9802	2161	8168	1852	7001

*Important Note: recovery shown is calculated using a 90% combustion efficiency. The efficiency of this unit will increase with lower return water temperature and/or lower modulation point, which will lead to higher recovery.

LAARS HEATING SYSTEMS

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LAARS® U.H.E.™ Series Commercial Gas Ultra High Efficiency Water Heater

Features:

- Thermal Efficiency up to 99.1%
- Three Pass Flue System
- Low NOx Premix Power Burner
- Ultra Quiet Operation
- Submerged Combustion Chamber
- Non-CFC foam insulation
- Flexible Venting — Conventional, Through-the-Wall or Direct Vent
- 1" NPT side connection for hydronic applications
- Electronic Controls
- Zero Inch Clearance to combustibles
- Glass-lined steel tank
- Four protective magnesium anode rods
- Hand hole cleanout — Allows inspection of tank interior
- Factory installed sediment reducing cold water inlet tube
- Factory installed dielectric fittings
- 60 gallon (227 Liters) tank capacity in 125,000 (36.6 kW), 150,000 (43.9 kW) and 199,999 (58.6 kW) BTU/hr Inputs
- 100 Gallon (379 Liters) tank capacity in 150,000 199,999, 250,000, 300,000 and 399,999 BTU/hr Inputs
- 3" Optional Concentric Vent Kit
- ASME Construction available
- NSF Construction available with optional kit
- Brass drain valve
- T&P relief valve factory installed
- Three year limited warranty on steel tank
- One year limited warranty on parts

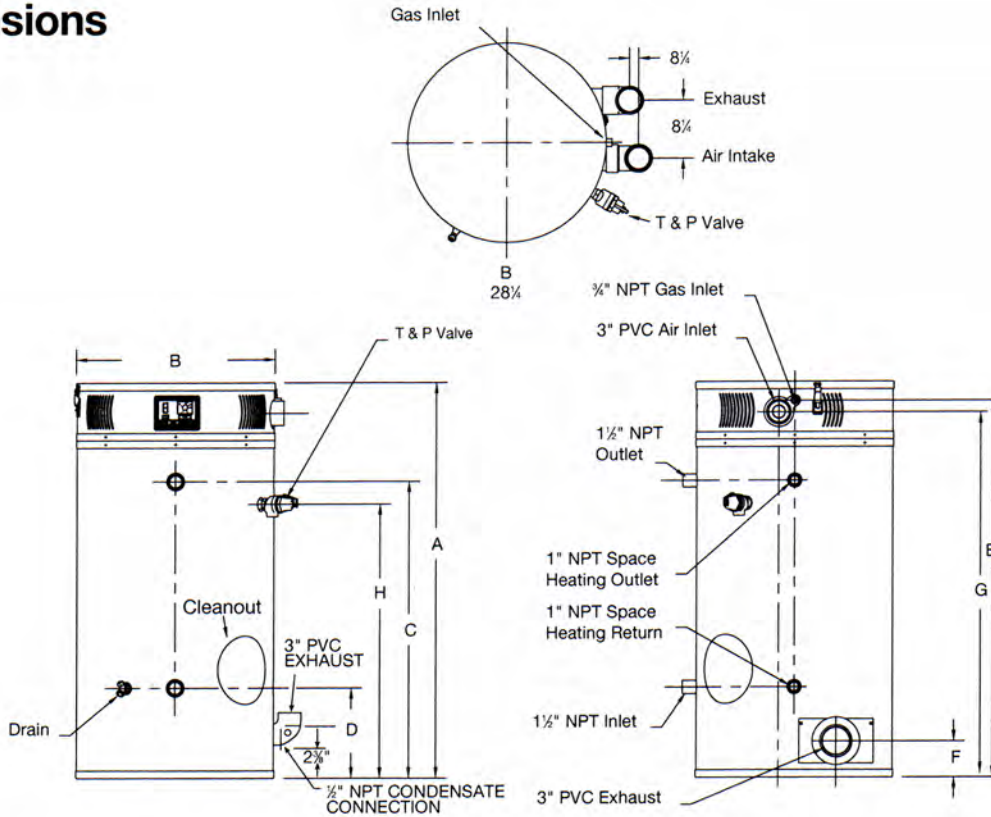


Photo is of UHE-100T-199

LAARS HEATING SYSTEMS

Dimensions

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NOTE: Diagrams are for both the 60 and 100 gallon models.

Commercial Ultra High Efficiency

U.H.E.™ Series MODELS Includes installed T&P Valve and Electronic Ignition.

V	●	★	MODEL NUMBER	INPUT BTU	1ST HR. DEL. GAL. AT 100°F RISE	RECOVERY GPH AT DEGREE RISE			STG. CAP U.S. GAL.	THERM EFF. %	DIMENSIONS IN INCHES											
						40°F	100°F	140°F			A HT.	B DIA.	C HOT OUT	D COLD IN	E FL. TO GAS CONN.	F FL. TO VENT OUTLET	G FL. TO AIR INTAKE	H FL. TO T&P VALVE CONN.	WTR. CONN. DIA.	GAS CONN. DIA.	RELIEF VALVE OPEN	SHPG. WT. (LBS.)
V	●	★	UHE-60T-125E-3N(A)	125,000	187	364	145	104	60	96.0	57	28 3/4	42	12 1/4	53 3/4	5 1/2	52 1/2	40	1 1/2	3/4	3/4	570
V	●	★	UHE-60T-150E-3N(A)	150,000	211	423	169	121	60	93.0	57	28 3/4	42	12 1/4	53 3/4	5 1/2	52 1/2	40	1 1/2	3/4	3/4	570
V	●	★	UHE-60T-199E-3N(A)	199,999	265	558	223	159	60	92.0	57	28 3/4	42	12 1/4	53 3/4	5 1/2	52 1/2	40	1 1/2	3/4	3/4	570
V	●	★	UHE-100T-150E-3N(A)	150,000	250	450	180	129	100	99.1	78	28 3/4	63	12 1/4	74 1/4	5 1/2	73 3/4	60	1 1/2	3/4	3/4	900
V	●	★	UHE-100T-199E-3N(A)	199,999	309	597	239	171	100	98.5	78	28 3/4	63	12 1/4	74 1/4	5 1/2	73 3/4	60	1 1/2	3/4	3/4	900
V	●	★	UHE-100T-250E-3N(A)	250,000	364	735	294	210	100	97.0	78	28 3/4	63	12 1/4	74 1/4	5 1/2	73 3/4	60	1 1/2	3/4	1	900
V	●	★	UHE-100T-300E-3N(A)	300,000	405	836	335	239	100	92.0	78	28 3/4	63	12 1/4	74 1/4	5 1/2	73 3/4	60	1 1/2	3/4	1	900
V	●	★	UHE-100T-399E-3N(A)	399,999	521	1127	451	322	100	93.0	77 1/2	28 3/4	63	13	73 3/4	5 1/2	73 3/4	60	1 1/2	1	1	950

V	●	★	MODEL NUMBER	INPUT KW	1ST HR. DEL. LPH AT 56°C RISE	RECOVERY LPH AT DEGREE RISE			STG. CAP LITER	THERM EFF. %	DIMENSIONS IN MILLIMETERS											
						22°C	56°C	78°C			A HT.	B DIA.	C HOT OUT	D COLD IN	E GAS CONN.	F FL. TO VENT OUTLET	G FL. TO AIR INTAKE	H FL. TO T&P VALVE CONN.	WTR. CONN. DIA.	GAS CONN. DIA.	RELIEF VALVE OPEN	SHPG. WT. (KG)
V	●	★	UHE-60T-125E-3N(A)	36.6	708	1378	545	394	227	96.0	1448	718	1067	327	1365	130	1324	994	38	19	19	259
V	●	★	UHE-60T-150E-3N(A)	43.9	799	1601	640	458	227	93.0	1448	718	1067	327	1365	130	1324	994	38	19	19	259
V	●	★	UHE-60T-199E-3N(A)	58.6	1003	3112	844	602	227	92.0	1448	718	1067	327	1365	130	1324	994	38	19	19	259
V	●	★	UHE-100T-150E-3N(A)	43.9	946	1703	681	488	379	99.1	1981	718	1600	327	1899	130	1857	1527	38	19	19	408
V	●	★	UHE-100T-199E-3N(A)	58.6	1170	2260	905	647	379	98.5	1981	718	1600	327	1899	130	1857	1527	38	19	19	408
V	●	★	UHE-100T-250E-3N(A)	73.2	1378	2782	1113	795	379	97.0	1981	718	1600	327	1899	130	1857	1527	38	19	25	408
V	●	★	UHE-100T-300E-3N(A)	87.9	1533	3165	1268	905	379	92.0	1981	718	1600	327	1899	130	1857	1527	38	19	25	408
V	●	★	UHE-100T-399E-3N(A)	117.2	1972	4266	1707	1219	379	93.0	1972	718	1600	330	1861	130	1857	1527	38	25	25	431

For propane gas models change suffix "N" to "X" and remove "E" from the model number. Example: UHE-100T-150-3X

V - 115V A.C. Required

● - Electronic Ignition

★ - Listed with California Energy Commission

(A) ASME - All models are available with ASME construction. To order ASME construction add the (A) to the end of the model number. Example: UHE-60T-125E-3NA

Note: The weight is the same for both ASME and Non-ASME models.

NSF Construction Available with optional kit

Complies with SCAQMD low NOx requirements — 10.39 nanograms per joule

Design certified by CSA International (formerly AGA/CGA)

Amp Draw range = 1.0 to 1.8 amps

150 PSI Working Pressure (1034 kPa), 300 PSI Test Pressure (2068 kPa)

OKLAHOMA CITY • (405) 239-7301
(800) 289-3331 • FAX: (405) 232-5438

TULSA • (918) 249-1918
(800) 955-1918 • FAX: (918) 249-9014

LAARS HEATING SYSTEMS

1

Pump-Mounted Pool Heater

PENNANT

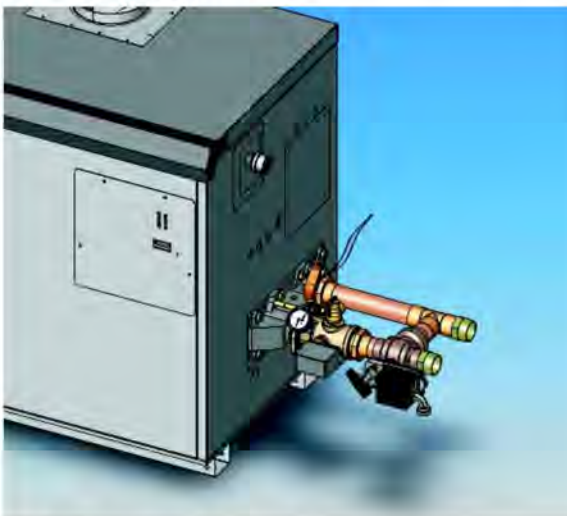
Commercial Pool Heaters



The Pennant line of high-performance pool heating boilers from LAARS delivers efficiency levels of 85% or more. NOx emissions are among the lowest in the industry at 10 ppm.



Automatic Mixing System.



Low Return Water Temperature Protection.

Pennant Pool Heaters Include Advanced Features

Pennant commercial pool heaters from LAARS Heating Systems are backed by over 50 years of manufacturing commercial pool heaters and offer many advanced features specific to the commercial swimming pool and water theme park market.

Every Pennant pool heater now comes standard with a built-in automatic mixing system to make sure low return water temperatures won't cause problematic condensation in the heat exchanger. The LAARS mixing system includes an automatic three-way valve, fast-acting electronic actuator, factory mounted and wired pump, and a simple operating control that monitors all the important functions of the system. This means that the Pennant can handle return water temperatures as low as 60 degrees without the problem of condensation. And, every Pennant pool heater now comes

standard with a "Backwash Switch" that allows maintenance staff to safely prepare the Pennant for a filter backwash by allowing the pump time-delay to complete its cycle before shutting down the heater - avoiding the problem of nuisance high-limit shut-downs.

Whether you want to

use room air for combustion or take a from outside; vent into a chimney, or through a side-wall; install the heater indoors or outside, the Pennant is ready "out of the box" to meet your needs.

Pennants Fit a Wide Range of Application Requirements

The Pennant is uniquely designed to make pool heating easy and reliable because LAARS does all of the set-up for you. The Pennant automatic bypass system is factory pre-set and no field adjustments are required. The same is true for the combustion system. Whether you are installing a Pennant at sea level or at 10,000' elevation, it is complete as it arrives from the factory. No orifice changes or component changes are necessary for high altitude installations.

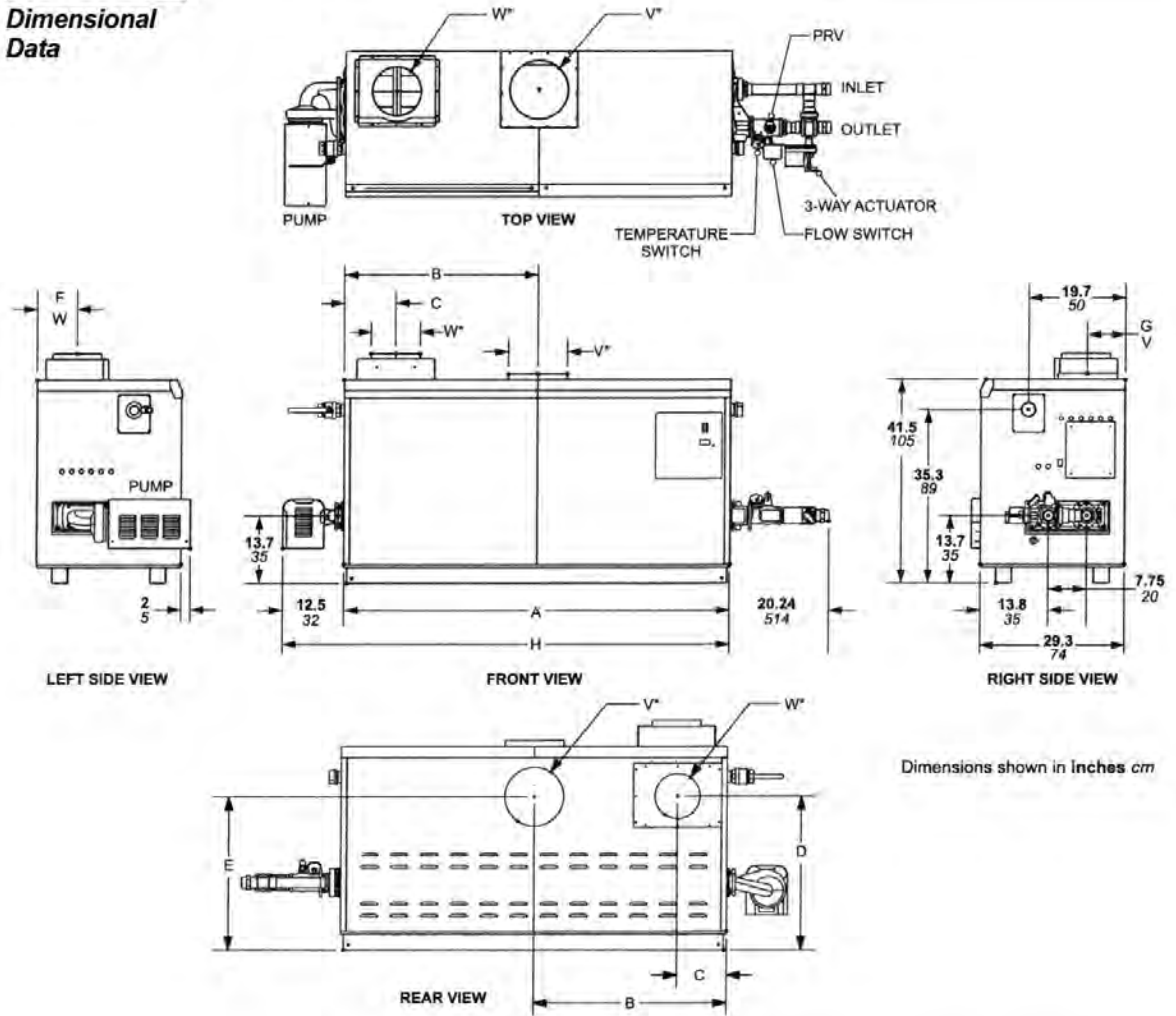
Installation and Service

Installation and service are also very easy with a Pennant. Fan-assisted and filtered combustion air, reversible vent and intake air terminals, a separate field wiring terminal panel, front panel diagnostics, optional rack-mounting, and reversible gas and water connections allow Pennants to be installed almost anywhere with minimal effort. And, with a quick-access panel for igniter replacement, combustion chamber sight glasses on both right and left sides, and dual ignition systems for all models over 750,000 BTU, the Pennant pool heater takes service access to a new high standard. Where water conditions warrant extra protection, cupronickel tubing in the heat exchanger is an option.

LAARS HEATING SYSTEMS

1

Dimensional Data



Size	A		B		C		D		E		F		G		H		Air Conn. W*	Vent Conn. V*	Horiz. Vent Pipe			
500	33½	85	15¼	40	5¼	15	29¾	76	32¾	83	7¼	20	8¼	22	46	117	6	15	6	15	6	15
750	45½	116	21¼	55	5¼	15	29¾	76	32¾	83	7¼	20	8¼	22	58	147	6	15	8	20	6	15
1000	57½	146	28¾	73	5¼	15	29¾	76	32¾	83	7¼	20	7	18	70	178	8	20	10	25	8	20
1250	68	172	34	86	10⅞	26	30¾	78	29½	75	8¼	22	8¼	22	80	203	8	20	12	30	8	20
1500	78½	199	39¾	101	10⅞	26	30¾	78	29½	75	8¼	22	8¼	22	91	231	8	20	12	30	8	20
1750	89	226	44½	113	10⅞	26	30¾	78	29½	75	8¼	22	8¼	22	101	256	8	20	14	36	8	20
2000	99½	253	49¾	126	10⅞	26	30¾	78	29½	75	8¼	22	8¼	22	112	284	12	30	14	36	12	30

*Air and vent connections may be on top or back of the Pennant, and are field convertible.

Dimensions in inches cm.



800.900.9276 • Fax 800.559.1583 (Customer Service, Service Advisors)
20 Industrial Way, Rochester, NH 03867 • 603.335.6300 • Fax 603.335.3355
1869 Sismet Road, Mississauga, Ontario, Canada L4W 1W8 • 905.238.0100 • Fax 905.366.0130
www.Laars.com Litho in U.S.A. © Laars Heating Systems 0804 Document 3162D

See Tech Tip #24 on page 330 for useful information on swimming pool heaters.

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LAARS HEATING SYSTEMS

1

Sizing Chart and Clearances Data

For Indoor Pools

The selection charts below will assist in choosing the correct size Pennant for an indoor pool. First, calculate the surface area of the pool in square feet. Second, refer to the selection chart. Third, find the closest square footage in the 10°F (6°C) Temperature Difference column, and the heater model which corresponds to it. For normal conditions, Laars recommends using the 10°F (6°C) Temperature Difference columns; this will provide a temperature increase of approximately 6°F (3°C) per 24 hour period.

For Outdoor Pools

The selection charts below will assist in choosing the correct size Pennant for an outdoor pool. First, determine the difference between the desired pool temperature and the average air temperature during the coldest month in which the pool will be used (referred to in the chart below as "Temperature Difference"). Second, calculate the surface area of the pool. Third, refer to the selection chart. Listed are the maximum pool surface areas for each heater model with typical temperature differences. Make the appropriate selection from the chart.

PNCP	Temperature Difference																	
	10°F 6°C		15°F 8°C		20°F 11°C		25°F 14°C		30°F 17°C		35°F 19°C		40°F 22°C		45°F 25°C		50°F 28°C	
Model	Surface Area of Pool																	
	sq. ft.	sq. m	sq. ft.	sq. m	sq. ft.	sq. m	sq. ft.	sq. m	sq. ft.	sq. m	sq. ft.	sq. m	sq. ft.	sq. m	sq. ft.	sq. m	sq. ft.	sq. m
500	4090	370	2720	250	2040	180	1630	150	1360	120	1170	100	1020	90	910	80	810	70
750	6130	560	4090	370	3060	280	2450	220	2040	180	1750	160	1530	140	1360	120	1220	110
1000	8180	750	5450	500	4090	370	3270	300	2720	250	2340	210	2040	180	1820	160	1630	150
1250	10230	950	6820	630	5110	470	4090	370	3410	310	2920	270	2550	230	2280	210	2040	180
1500	12270	1130	8180	750	6130	560	4910	450	4090	370	3510	320	3060	280	2730	250	2450	220
1750	14320	1330	9540	880	7160	660	5720	530	4770	440	4090	370	3580	330	3190	290	2860	260
2000	16370	1520	10910	1010	8180	750	6540	600	5450	500	4680	430	4090	370	3650	330	3270	300

Clearances

Appliance Surface	Clearance from Combustible Material	Service Access Clearance	Appliance Surface	Clearance from Combustible Material	Service Access Clearance
Right Side	1" 2.5 cm	24" 61 cm	Top	1" 2.5 cm	12" 30 cm
Left Side	1" 2.5 cm	24" 61 cm	Back*	1" 2.5 cm	12" 30 cm
Front	1" 2.5 cm	36" 91cm	Vent	Per venting system supplier's instructions	

*When vent and/or air is connected to the back, 36" (91 cm) is suggested.

Sizing Data

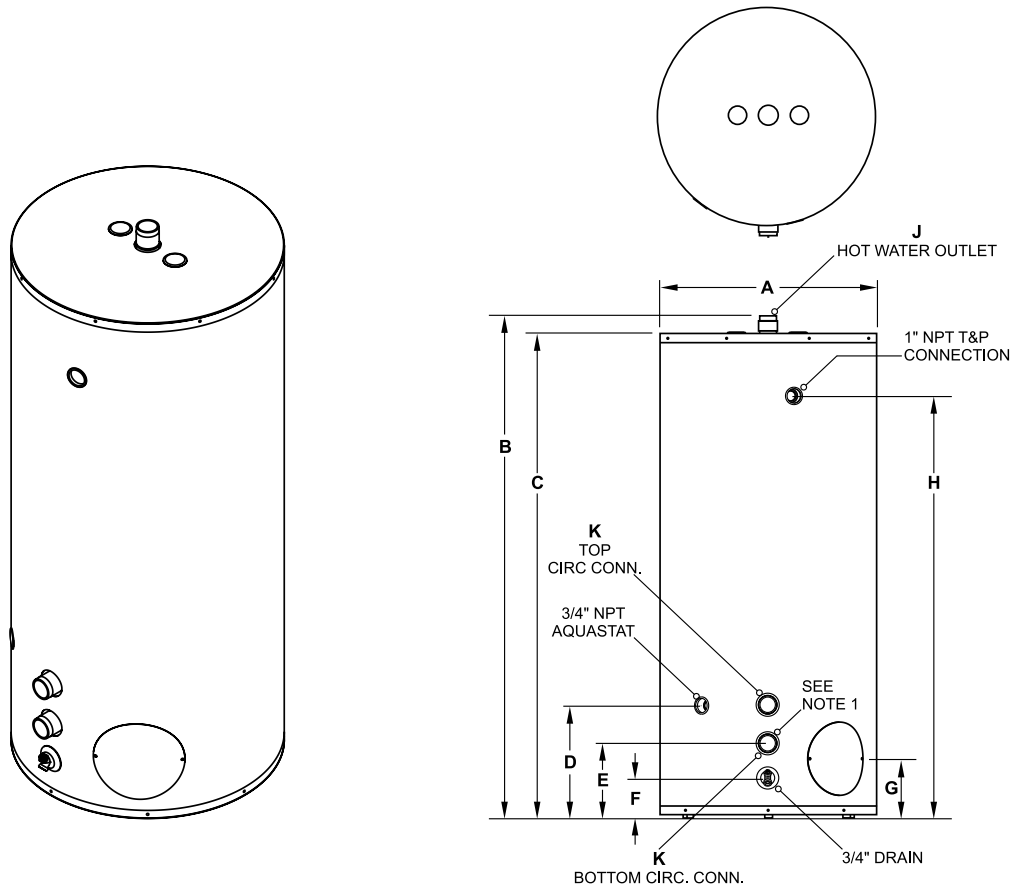
	Indoor Size	Input ¹ BTU/H	Output ¹ BTU/H	Gas Conn. Size inches ²	Heater Water Conn. Size inches ²	Mixing System Water Conn. Size inches ²	Shipping Weight lbs
<input type="checkbox"/>	500	500,000	425,000	1¼	2	2	495
<input type="checkbox"/>	750	750,000	638,000	1¼	2	2	575
<input type="checkbox"/>	1000	999,000	849,000	1½	2½	2	685
<input type="checkbox"/>	1250	1,250,000	1,062,500	2	2½	2	730
<input type="checkbox"/>	1500	1,500,000	1,275,000	2	2½	2	830
<input type="checkbox"/>	1750	1,750,000	1,487,500	2	2½	2	880
<input type="checkbox"/>	2000	1,999,000	1,699,000	2	2½	2	1025
	Indoor Size	Input ¹ kW	Output ¹ kW				Shipping Weight kg
<input type="checkbox"/>	500	147	125				225
<input type="checkbox"/>	750	220	187				261
<input type="checkbox"/>	1000	293	249				311
<input type="checkbox"/>	1250	366	312				331
<input type="checkbox"/>	1500	440	374				377
<input type="checkbox"/>	1750	513	436				400
<input type="checkbox"/>	2000	586	498				465

NOTES: 1. Input and output must be derated 4% per 1000 feet above sea level when installed above 2000 feet altitude.
2. Dimensions are nominal.

LAARS HEATING SYSTEMS

Stocked Tanks for Mighty Therm Volume Water Heaters

1



INSULATED TANKS FOR MIGHTY THERM HEATERS

Designed to be used with LAARS heaters where peak demands require stored water. Insulated tanks conform to the stringent efficiency performance criteria for energy consuming appliances set forth in ASHRAE 90.1b. Insulated tanks are glass lined, with 2" foam insulation for high "R" values. Insulated tanks come with relief valve opening, welded steel couplings, two anode rods, drain valve, and handhole cleanout. Jackets have enamel finish. Max. hydro. working pressure 150 psi.

Order No.	Model No.	Description	ASME Code Constr.	Dimensions (in)										Ship wt.	
				A	B	C	D	E	F	G	H	J	K		
				in	in	in	in	in	in	in	in	in	NPT	NPT	
TANK82	A0073100	80 Gal Insulated tank, 2" conn. 24" X 59.5"	N	24	61-7/8	59-1/8	14-1/2	9-1/2	5	7-1/2	52-3/4	2"	2"	192#	
TANK120	A0078800	119 Gal Insulated tank, 2" conn. 28" X 63"	N	28-1/4	65-3/8	63	14-1/2	9-1/2	5	7-1/2	54-7/8	2"	2"	312#	
TANK200	A2086000	200 Gal Insulated tank, 2-1/2" conn. 32" X 77"	Y	32	79-5/8	77	16-1/4	11-1/4	6-3/4	9-1/4	66	2-1/2"	2-1/2"	541#	
TANK330		330 Epoxy lined tank, no insulation, 125 psi w/2 2-1/2" and 2 3" outlets, 36" X 80"	Y	Call for exact dimensions										825#	

LAARS HEATING SYSTEMS

1



Heating Systems Company

A subsidiary of **BRADFORD WHITE** Corporation

LAARS® Custom Hot Water Storage Vessels Bare Tanks

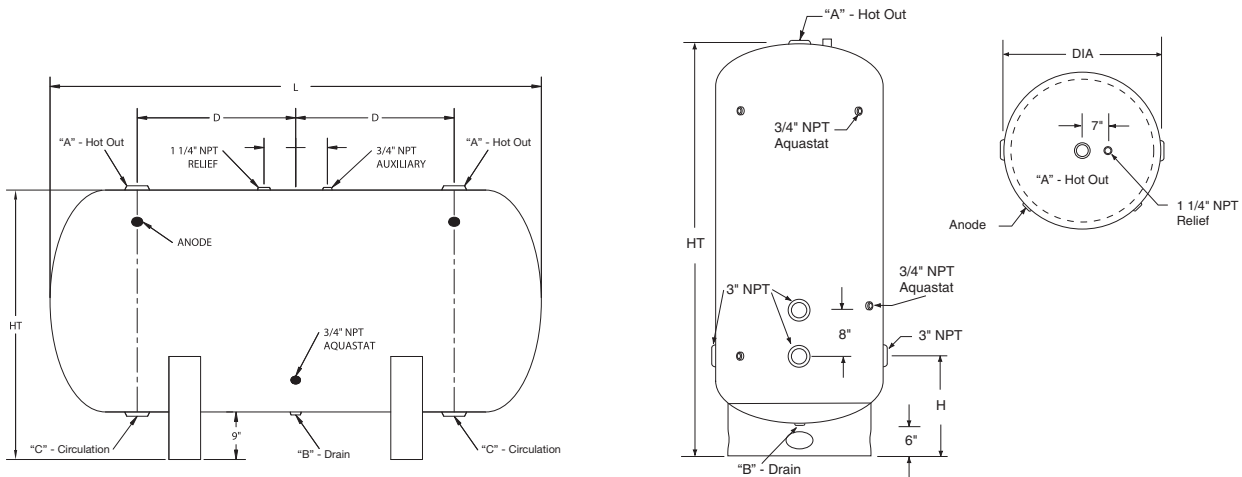
- **Designed for storage of potable water up to 180°F (82°C).**
- **All tanks are constructed and certified** — In accordance with ASME IV, Part HLW for 125 PSI (862 kPa).
- **Glass lined steel tank** — Applied to the interior surface of the steel providing a tough wear resistant lining which minimizes the effects of high temperature hot water.
- **Magnesium anode rod** — For protection and longer service life.
- **Two 3/4" aquastat NPT fittings** — Located in the lower and upper part of the tank.
- **6" Skirt height** — Allows for easier access to areas under the tank.
- **Lifting lugs** — Standard.
- **Red oxide primer** — Shop primer is standard on all tanks. Top coat and finish coats are available.
- **Five year limited warranty on steel tank** — Provides warranty protection against tank failure resulting from defects in materials and workmanship.
- **Ten year limited warranty on steel tank (with double glass lining)** — Provides superior warranty protection against tank failure. Double glass lining is not an inventory item, built upon request.



LAARS HEATING SYSTEMS

Water Storage Vessels Bare Tanks

1



CUSTOM TANK MODEL TREE

Digit/Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Reference	Product Series		Type	Lining	Insulation	Diameter		Length/Height			Manway	Tapping	Pressure	Options	Options	Options
Values	C	T	V H	G D E	B I J	X	X	X	X	X	M X	A B C S	S H I	A B C D X	X	X

- LHSC PART No.**
- 1-2 Product Series: CT = Custom Tank
 - 3 Type: V = Vertical; H = Horizontal
 - 4 Lining: G = Glass; D = Double Glassed 10-year; E = Epoxy
 - 5 Insulation: B = Bare Tank; I = Insulating Foam & Topcoat; J = Insulated & Steel Jacketed
 - 6-7 Diameter
 - 8-10 Length (or Height)
 - 11 Manway: M = Manway; X = Less Manway
 - 12 Tapping Size: A = 2.0"; B = 2.5"; C = 3.0"
S = Special Order (submit drawing indicating all tappings, use Doc. 8005)
 - 13 Pressure Rating: S = Standard 125 psi; H = 150 psi; I = Other
 - 14 Options: A = SS Flanges 125 psi; B = SS Flanges 150 psi; C = Add'l opening; D = Extended Cplgs, Inorganic zinc; X = None
 - 15 Custom Options: X = None
 - 16 Custom Options: X = None

W-H-196 Test = 7.0 - 8.0 mg/in²

The W-H-196 Test is required for water heaters sold to the U.S. Government. The test consists of exposing the enamel to a boiling (212 F) 4/10% solution of Sodium Bicarbonate for eight (8), eighteen (18) hour cycles. Maximum weight loss after eight cycles is not to exceed 15 mg/in².

PEI T-21 Spot Acid Test = Class A

PEI T-21 Spot Acid Test is used to determine enamel resistance to acids. The test area is examined for visible effects on the enamel and is graded from Class AA (no sign of etching) to Class D (etched surface).

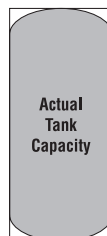
Impact resistance = Class 4 to 5

The Impact Resistance Test is used to determine the adhesive qualities of enamel to the substrate. The enamel is graded from Class 1 (worst) to Class 5 (best), fractured glass adhering solidly to the impact area. Class 3 is acceptable.

Hi-Pot Test Less than 20

The HYPO Test is a measurement of the continuity of the glass coating (Spark Test). Fifty (50) breakthroughs or fewer are the usual specification for HWT's.

*Nominal gallon capacity is listed for comparison purposes. Nominal gallon capacity refers to a hypothetical measurement in a case where overall tank length remains the same but instead of an elliptical head and base, the gallons are calculated as if it was built with flat heads and base (see diagram).



*Nominal capacity includes the white area in addition to actual tank capacity.



EVOLUTION
High Efficiency Water Boilers



1

Thermal Solutions has designed the Evolution® high efficiency copper-finned boilers to meet the needs of today's commercial heating requirements.

The Evolution takes the very best of existing copper-finned boiler technology to the next level by incorporating a list of design features not found in competitors products. *Real-life serviceability, innovative heat exchanger design, clean and efficient advanced combustion, and unique timesaving controls* are all combined in a compact quick-connect package with efficiencies of up to 88%. The Evolution is truly a step above the rest.

Real-Life Serviceability

The Evolution is adaptable to virtually any installation. Rear connection ports and complete front and rear access to the unit's components and controls simplify side-by-side modular applications. When venting is a concern, the Evolution offers sealed (direct vent) and power vent options so that the need to construct a costly chimney is eliminated. In addition, the easy setup and even easier maintenance makes the Evolution boilers ideal for either retrofit or new construction projects.



Heat Exchanger

Innovative Heat Exchanger Design

Central to the Evolution's highly efficient operation is the design of its copper-tube heat exchanger. Not only does it efficiently maintain heat transfer, but the innovative gasketless carbon steel header provides for easy inspection, cleaning and individual tube replacement. The combustion chamber is also completely enclosed in a stainless steel compartment and features collection/evaporation components to effectively handle cold-start condensate. Combining these features, the Evolution offers state-of-the-art heat transfer properties while effectively dealing with start-up condensate.



Ceramic Radiant Burner

Clean and Efficient Advanced Combustion

Designed to operate at 88% thermal efficiency with NOx ratings less than 9.9 ppm, the Evolution's noiseless ceramic radiant burner runs at minimal excess air levels creating highly efficient, trouble-free operation. The rugged industrial cast aluminum blower and fan wheel are equipped with a replaceable combustion air filter (99% efficient to one micron) to create excellent combustion characteristics and even air distribution. There's no need for tricky pressurized compartments...the Evolution can even be operated with its jacket panels removed for easy inspection or maintenance.

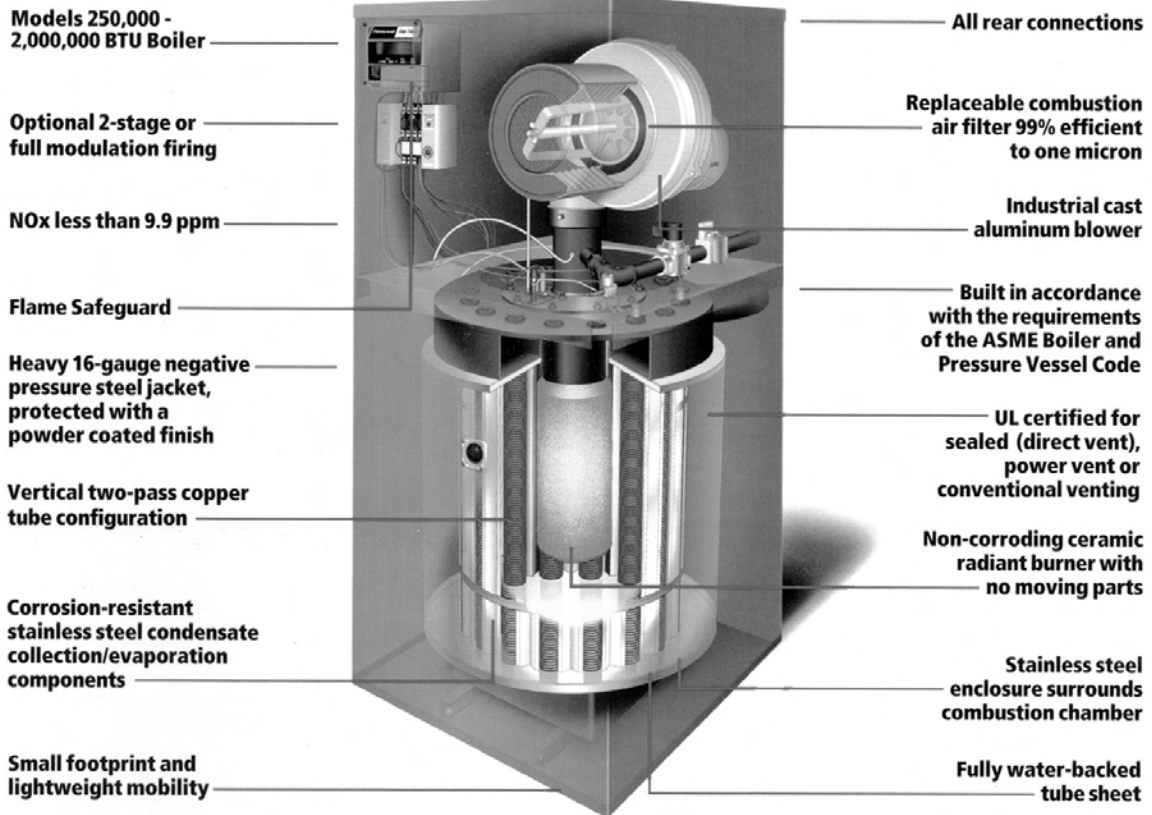


Honeywell RM 7896

Unique Timesaving Controls

Instead of using a series of relays, the Evolution utilizes state-of-the-art microprocessor flame safeguard controls to provide extensive diagnostic information including first-out fault annunciation using an LED diagnostic display. The proven spark-to-pilot ignition system ensures that the pilot is lit before allowing the main gas valve to open. The optional display unit, as shown at the left, can be easily incorporated to provide additional operational information and history.

EVOLUTION FEATURES



- Efficiencies up to 88%
- Non-proprietary parts
- Factory fire-test every unit
- Single-point electrical hook-up for all voltage options
- Standard sealed combustion
- Standard UL/FM/CSD-1 controls and gas train (optional IRI or IRI w/ proof of closure)
- Quiet operation (<60db)

- Electric spark-to-pilot-ignition system
- Aluminum non-sparking fan assembly
- Filtered combustion air
- Jacket design lends itself to complete access to all components for easy serviceability
- Quick-connect compact package
- Reduced stack sizes—multiple venting options

RATINGS & DIMENSIONS

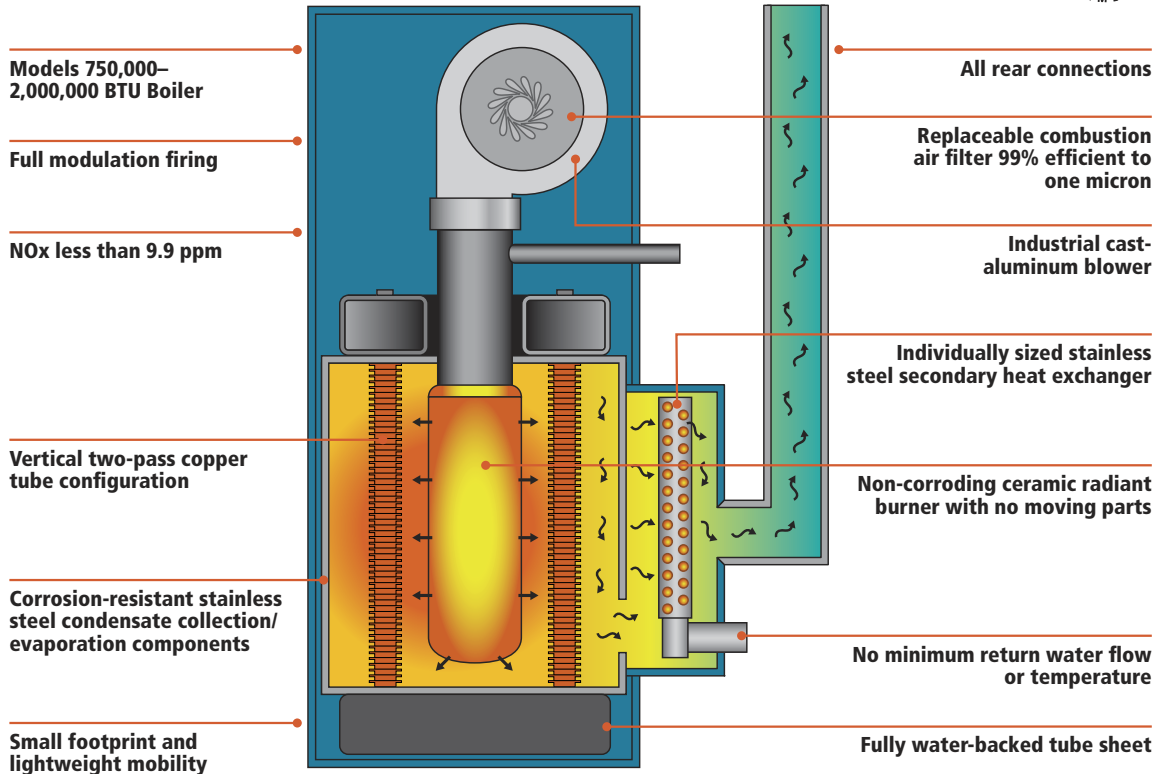
Boilers (Indoor)

1

Model	EV-250	EV-500	EV-750	EV-1000	EV-1500	EV-2000	EV-2000S	EV-2500	EV-3000
Input-High Fire BTUH	250,000	500,000	750,000	1,000,000	1,500,000	2,000,000	2,000,000	2,500,000	3,000,000
Output-High Fire BTUH	220,000	440,000	660,000	880,000	1,320,000	1,760,000	1,760,000	2,200,000	2,640,000
Input-2-Stage Fire BTUH	n/a	n/a	375,000	500,000	750,000	1,000,000	n/a	n/a	n/a
Input-Mod Low Fire BTUH	83,333	166,666	250,000	333,333	500,000	666,667	666,667	833,333	1,000,000
Output-Mod Low Fire BTUH	73,333	146,666	220,000	293,333	440,000	586,667	586,667	733,333	880,000
Boiler H.P.	6.6	13.1	19.7	26.3	39.4	52.6	52.6	65.7	78.9
Sq. Ft. per BHP	9.9	9.4	6.6	6.7	6.7	6.7	8.0	8.1	8.1
Width - dim A (mm)	28.25" (717.55)	28.25" (717.55)	28.25" (717.55)	28.25" (717.55)	28.25" (717.55)	28.25" (717.55)	38.25" (971.55)	38.25" (971.55)	38.25" (971.55)
Depth - dim C (mm)	30.25" (768.35)	30.25" (768.35)	30.25" (768.35)	30.25" (768.35)	30.25" (768.35)	30.25" (768.35)	40.25" (1022.35)	40.25" (1022.35)	40.25" (1022.35)
Height - dim B (mm)	56.75" (1441.45)	71.188" (1808.18)	60.938" (1547.81)	65.188" (1655.76)	79.438" (2017.71)	91.813" (2332.04)	70.5" (1790.7)	77.5" (1968.5)	84.5" (2146.3)
Gas Connection	1" NPT	1-1/4" NPT	1-1/2" NPT	1-1/2" NPT	1-1/2" NPT	1-1/2" NPT	1-1/2" NPT	2" NPT	2" NPT
Water Connections	2" NPT	2" NPT	3" NPT	3" NPT	3" NPT	3" NPT	4" NPT	4" NPT	4" NPT
Air Inlet Connection	3" (76.2)	4" (101.6)	6" (152.4)	6" (152.4)	8" (203.2)	8" (203.2)	8" (203.2)	8" (203.2)	8" (203.2)
Vent Connection	3" (76.2)	4" (101.6)	4" (101.6)	6" (152.4)	6" (152.4)	6" (152.4)	6" (152.4)	8" (203.2)	8" (203.2)
Shipping Weight	500#	552#	955#	1110#	1215#	1350#	1902#	1952#	2002#

MAKING THE BEST EVEN BETTER The NEW Condensing Evolution® (EVC)

EVOLUTION® CONDENSING UNIT FEATURES



Models 750,000–
2,000,000 BTU Boiler

Full modulation firing

NOx less than 9.9 ppm

Vertical two-pass copper
tube configuration

Corrosion-resistant stainless
steel condensate collection/
evaporation components

Small footprint and
lightweight mobility

All rear connections

Replaceable combustion
air filter 99% efficient to
one micron

Industrial cast-
aluminum blower

Individually sized stainless
steel secondary heat exchanger

Non-corroding ceramic radiant
burner with no moving parts

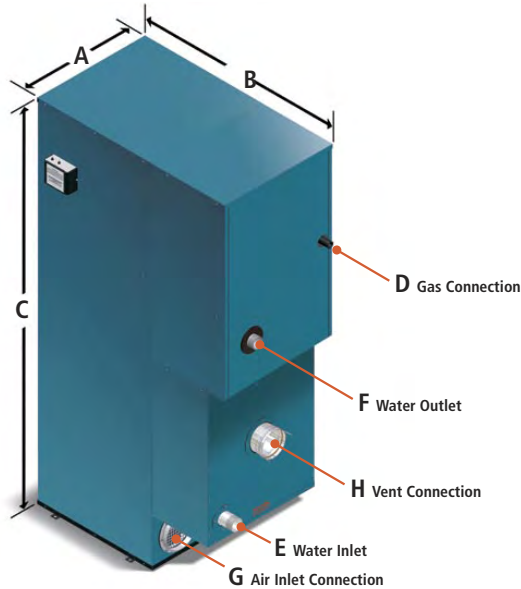
No minimum return water flow
or temperature

Fully water-backed tube sheet

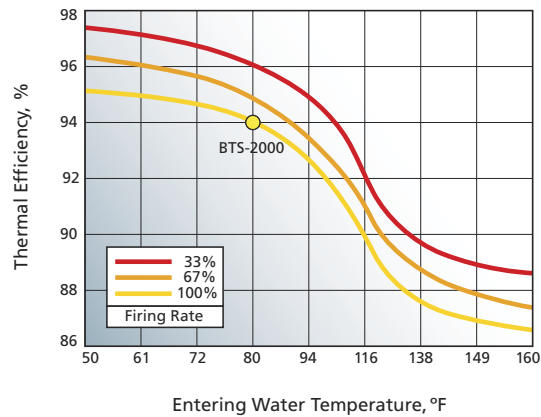
- Proven technology in higher efficiencies
- The most robust design on the market today
- Up to 97% thermal efficiency (BTS-2000 certified)
- Infinitely proportional firing
- VFD air control; no dampers or linkages
- Non-proprietary controls
- Ultra-low 9.9 NOx; is below all current standards
- Non-proprietary parts
- Factory fire-test on every unit
- Standard sealed combustion

- Single-point electrical hook-up for all voltage options
- Standard UL/FM/CSD-1 controls and gas train (optional IRI or IRI with proof of closure)
- Quiet operation (<60 dB)
- Electric spark-to-pilot-ignition system
- Aluminum non-sparking fan assembly
- Filtered combustion air
- Jacket design lends itself to complete access to all components for easy serviceability
- Quick-connect compact package
- Reduced stack sizes — multiple venting options

Ratings and Dimensional Data



EVC Thermal Efficiency



Third party certified to BTS-2000 (ASHRAE 90.1)

	EVC-750	EVC-1000	EVC-1500	EVC-2000
Input: High Fire BTUH	750,000	1,000,000	1,500,000	2,000,000
Output: High Fire BTUH	705,000	940,000	1,410,000	1,880,000
Input: Mod Low Fire BTUH	250,000	333,333	500,000	666,667
Output: Mod Low Fire BTUH	242,500	323,333	485,000	646,667
Boiler Horsepower	21.1	28.1	42.1	56.2
Sq. Ft. per BHP	13.4	13.4	13.5	13.5
Width: "A"	30.25" (768.4)	30.25" (768.4)	30.25" (768.4)	30.25" (768.4)
Depth: "B"	53"	53"	53"	53"
Height: "C"	60.938" (1548)	65.188" (1656)	79.438" (2018)	91.813" (2332)
Gas Connection: "D" NPT	1-1/2" NPT	1-1/2" NPT	1-1/2" NPT	1-1/2" NPT
Water Inlet: "E" NPT	2-1/2" NPT	2-1/2" NPT	2-1/2" NPT	2-1/2" NPT
Water Outlet: "F" NPT	2" NPT	2" NPT	2" NPT	2" NPT
Air Inlet Connection: "G"	6" (152.4)	6" (152.4)	8" (203.2)	8" (203.2)
Vent Connection: "H"	4" (101.6)	6" (152.4)	6" (152.4)	6" (152.4)
Shipping Weight: lbs.	1470	1625	1730	1865

Dimensions are inches (mm)

PL81467601071-2/08
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 P.O. Box 3244, Lancaster, PA 17604-3244
 Telephone: 717-239-7642, Fax: 877-501-5212
 www.thermalsolutions.com





Innovative Responses Today to Tomorrow's Challenges

Industrial Steam offers you a wide range of important benefits in the design, installation and operation of boiler room equipment. With more than 35 years of direct experience, we have a comprehensive technical knowledge of boiler systems and applications.

Our reputation for excellence is built upon a company-wide commitment to efficient designs, quality workmanship and complete customer satisfaction.

Deaerators and Boiler Feedwater Systems

Industrial Steam makes custom deaerators and boiler feed systems for virtually all applications.

Pressurized Deaerators

Jet Spray (JS5) - spray type deaerator

- .005 cc/l

Vertical Jet Spray (JSV5)

- .005 cc/l
- Vertical space saving design
- Up to 1000 hp

Steam Flow (SF5)

- .005 cc/l from 0-100% load
- Two compartment receiver with constant recycle
- Required for rapid load changes and difficult applications

Tray (ST5)

- .005 cc/l
- Counter flow tray design
- Ideal for large industrial and process applications
- Utilizes flashing condensate

Packed Column (PC5)

- .005 cc/l
- Counter flow design
- Tray type performance for smaller applications

Atmospheric Deaerators

Spray Flow II (SP)

- The Smart Deaerator
- .005 cc/l from 0-100% load
- Double section receiver with recycle
- Eliminates air re-entry
- Low vent loss

TA Boiler Feedwater Systems

- Simplex, duplex, dual and triplex systems
- Receiver size from 100 to 1000 gal
- System capacity to 500 hp and 150 psig

Heat Recovery Systems

Supernipper Continuous Blowdown Heat Recovery System

- Integral flash tank and heat exchanger
- Nearly 100% heat recovery

Zero Flash, Closed Loop, Pressurized Condensate Systems

- Returns high pressure condensate directly to boiler
- Eliminates flash steam and heat loss
- Eliminates steam traps

Other Boiler Room Equipment and Accessories

Wilson Blowdown Systems

- Centrifugal blowdown separator
- Flash tanks, blowdown tanks
- Aftercooler, cooling water control package
- Silent exhaust heads
- Condensing units

Ebcor Electric Boiler

- Electrode type boiler
- 3 to 90 hp
- 15-1200 psig
- Self modulating controls
- Ideal for variable loads and intermittent use

Economizers

- Rectangular, cylindrical

Stainless Steel Condensate Units

- Simplex and duplex pumps
- Stainless steel receiver and pumps
- 9 to 55 gal receivers
- 750 to 6,250 lb/hr, 3000 to 25,000 EDR

Chemical Feed Systems

- 50, 100 & 250 gal. tanks
- HDPE, Carbon steel, 304SS & PE liner

Water Softeners

- 1-30 cu. ft. resin capacity
- 30,000 to 900,000 gr. Exchange capacity
- 10 to 185 g.p.m. continuous, 20-270 g.p.m. peak
- Single and dual units with automatic regeneration

Industrial and Process Vessels and Systems

Our custom-designed pressure vessels are suited to many process applications. They meet ASME code and are built to the most rigorous customer performance specifications.

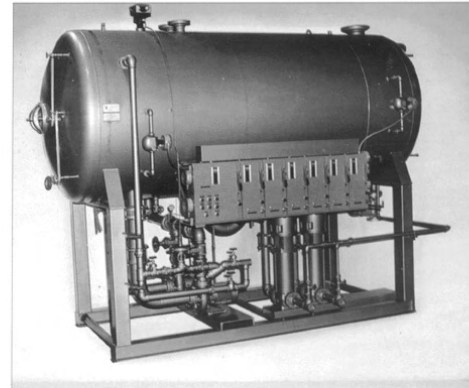
- ASME coded and non-coded vessels and systems
- Packaged with pumps, heat exchangers, and control instrumentation
- Temperature, pressure, level and flow control applications
- Liquid-liquid, gas-liquid and steam-water applications.
- Carbon steel, stainless steel and TFE lined construction

- Accumulators and receivers
- Filter and dryer vessels
- Knockout drums
- Holding tanks and day tanks
- Neutralization tanks
- Process vessels
- Reactors
- Separators

Industrial and Process Vessels and Systems



Custom-designed pressure vessels built to the most exacting specifications.



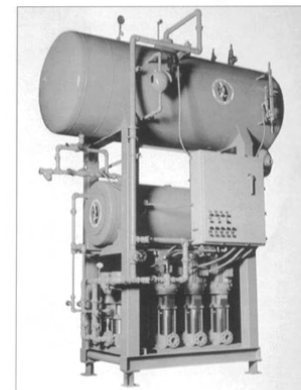
Industrial Steam offers the industry's widest range of deaerators and boiler feedwater systems



Heat Recovery Systems

Heat recovery systems generate fuel savings in excess of 5%

Custom Systems and other Boiler Room Equipment



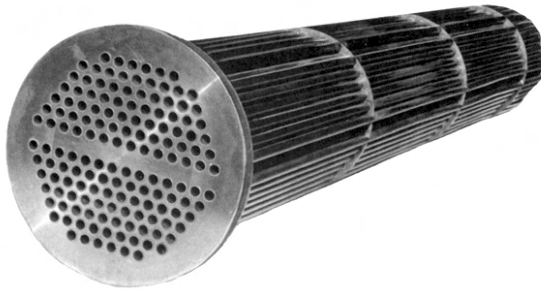
Industrial Steam's complete line of boiler room equipment and accessories includes Ebcor electric boilers, Wilson blowdown systems, stainless steel condensate units and much more.

For more information, visit www.industrialsteam.com.

CEMLINE® Products

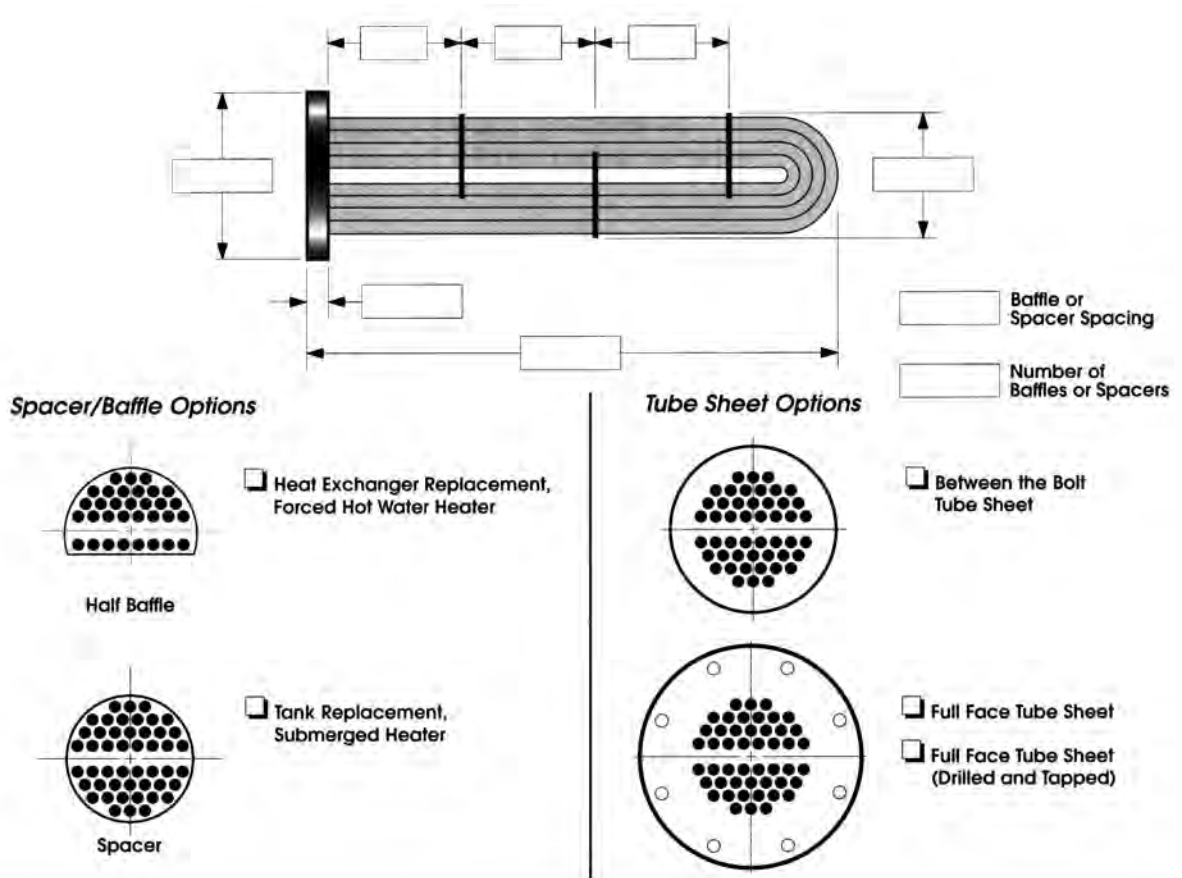
USG SERIES  Unfired Steam Generators	WATER HEATERS  Instantaneous & Semi-Instantaneous	CST SERIES  StoneSteel® Storage Tank	JST SERIES  StoneSteel® Jacketed Storage Tank
CWB TANKS  Chilled Water Buffer Tanks	SEB TANKS  Hydronic Boiler System Efficiency Buffer Tanks	STEEL TANK  CEMLINE's Full Range of Steel Tanks	REPLACEMENT TUBE BUNDLES  For Storage Water Heaters and Heat Exchangers
CBO SERIES  Centrifugal Boiler Blow Off Condensate Cooler	FST SERIES  Flash Tanks	CCP TANKS  Non-Electric Steam or Air Powered Condensate Pumps	

For complete product details and online selection software, go to www.cemline.com



Use this form when ordering your replacement tube bundle. Copy this page, fill in the blanks and then fax it to Federal.

1



Please fill in information that is known.

Tube Sheet

- Steel
- Copper Lined
- Other

Number of Passes

- 2 Passes
- 4 Passes

Wall

- Single Wall
- Double Wall

O.D. of Tubes

Number of Tubes

Material of Tubes

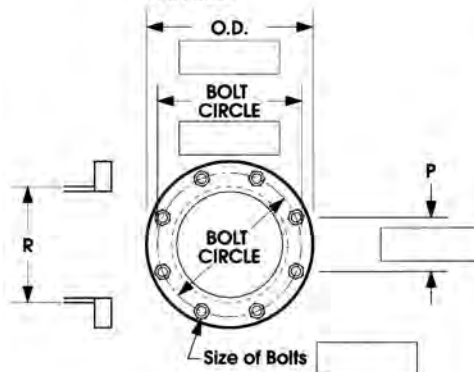
Often it is impossible to measure all dimensions while the unit is in service. We can manufacture a coil to fit when provided with the minimum of 4 dimensions.

Required information:

1. P - center to center of bolt holes.
2. Number of bolts.
3. R - O.D. of neck or circumference of neck.
4. Length of unit. If unknown, measure the length of vessel or maximum length available to remove bundle.

Optional information:

1. O.D.
2. Bolt circle
3. Size of bolts



11-00

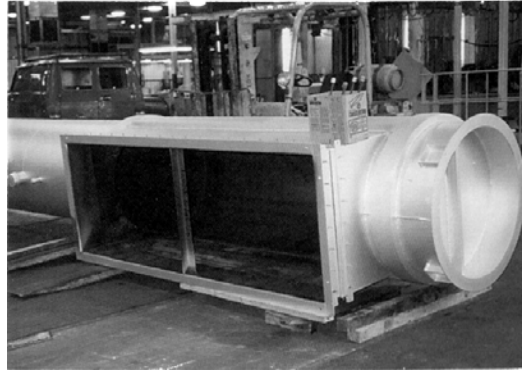
SCHEBLER

A Schebler chimney for every application.

1

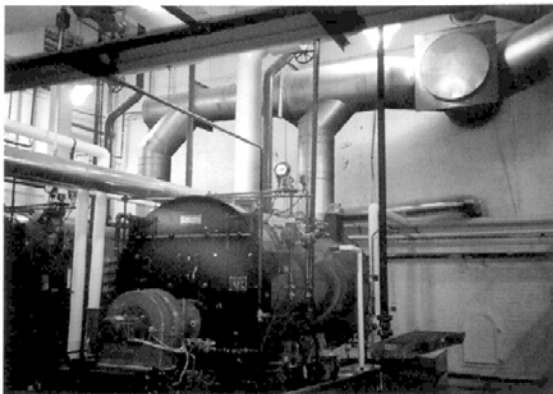


A wide range of materials for inner liners and outer shells are available with Schebler chimneys. In this application, special high-corrosion-resistant stainless steel was used to vent 38 high-efficiency boilers in a large sports complex.



Schebler has the ability to design, engineer and manufacture heavy-wall stacks such as the one shown here. These stacks can be designed with lateral supports or totally unguied.

Schebler



Schebler chimney components are being used as breeching in this school installation. Support plates, full angle rings and half angle rings can be used to supports horizontal runs between the appliance and the chimney.

SPECIAL PARTS

Most exhaust systems can be assembled from our wide variety of standard components. But if a special part is required, we can fabricate it. Square to rounds, test ports, special bolting flanges and odd fittings are just a few of the specials that we build on a regular basis. This means that you can purchase the entire system from one manufacturer.



With proper support, Schebler chimney components can be used to make stacks of virtually any height. The stack shown here uses wall supports and wall guides to support the chimney along the building structure.

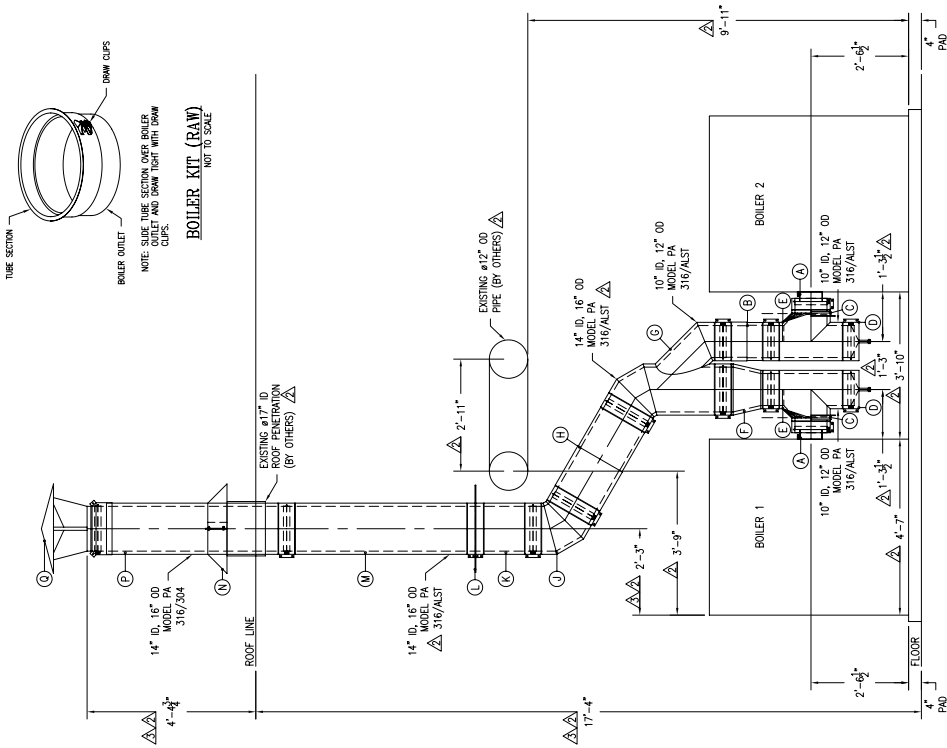
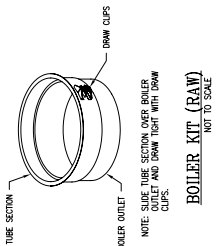
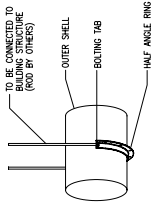
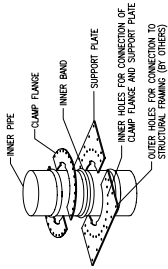
Visit www.schebler.com
for complete chimney
information

Schebler

Schebler can take your most complex needs, transform them into detailed CAD drawings and then produce and deliver a stack to fulfill those requirements.

1

ITEM	QTY	PART NUMBER	DESCRIPTION	MATERIAL
A	2	SFC1	PA INCREASES BOILER KIT (RAW) 14" x 10"	316/ALST
B	1	PA1GAL10B	14" TO 17" ADJUSTABLE	316/ALST
C	2	PHR10H	HALF RING	CRST
D	2	PA2C10B	DRAIN TEE CAP	316/ALST
E	2	PA2T10B	BOOT TEE	316/ALST
F	1	PA2I14B	#10" x #14" x 15" TAPERED INCREASER	316/ALST
G	1	SFC2	PA #14" 60.00" ELBOW MAIN BRANCH W/45° ELBOW BRANCH	316/ALST
H	1	PA45L14B	27 1/2" TO 44" ADJUSTABLE	316/ALST
J	1	SFC3	PA #14" 60.00" ELBOW	316/ALST
K	1	PA18S14B	18" STRAIGHT SECTION	316/ALST
L	1	PA5P14H	SUPPORT PLATE	CRST
M	1	PA5S14B	59" STRAIGHT SECTION	316/ALST
N	1	PARC14C	RAIN COLLAR	304
O	1	PA5S114D	59" STRAIGHT SECTION	316/304
P	1	PA5S114D	59" STRAIGHT SECTION	316/304
R	7	IB10E	#10" INNER BAND	316
S	7	IB14E	#14" INNER BAND	316
T	3	OB12C	#12" OUTER BAND	ALST
U	5	OB16C	#16" OUTER BAND	ALST
V	2	HB16C	#16" HALF BAND	ALST
W	2	SPCA	PA #17" x #17" SEAL RING	ALST
X	5	S600	SILICONE JOINT SEALANT	ALST
Y	1	HARDWARE	BOX OF NUTS, BOLTS, ETC...	



- PA NOTES:**
1. ALL DIMENSIONS TO BE VERIFIED BY CONTRACTOR BEFORE RELEASING PROJECT FOR FABRICATION.
 2. OUTER SHELL MATERIAL TO BE 20 GA. 316 STAINLESS STEEL.
 3. OUTER SHELL MATERIAL TO BE 22 GA. ALUMINIZED STEEL, OUTER SHELL MATERIAL TO BE 20 GA. 304 STAINLESS STEEL.
 4. DIAMETERS 38" AND LARGER ON STRAIGHT SECTIONS TO BE 18 GA. MATERIAL. DIAMETERS 24" AND LARGER TO BE 18 GA. MATERIAL.
 5. INNER SHELL AND OUTER SHELL TO BE SPACED TO ALLOW FOR THERMAL EXPANSION.
 6. REFER TO SCHEBLER DESIGN MODEL FOR CORRECT INSTALLATION METHODS.

DRAWING APPROVAL

AT LEAST ONE CHECKED AND SIGNED COPY OF THIS DRAWING TO BE SUBMITTED TO THE OWNER BEFORE FABRICATION CAN BEGIN.

APPROVED REJECTED FURNISH AS CORRECTED REVISE & RE-SUBMIT SUBMIT SPECIFIC ITEM

DATE _____ BY _____

SUBMITTAL

DESIGNER	DIAMETER MODEL PA BOILER EXHAUST
DRAWN BY	FEDERAL CORPORATION
CHECKED BY	D.DIMMIG
DATE	11/30/05
SCALE	1/2" = 1'-0"
NO.	13416-01

The Schebler Co.
ENGINEERING & FABRICATION
BETHLEHEM, PA 18022

REV	DATE	BY	DESCRIPTION
3	03/10/06	D.D.	DIMENSION CHANGES
2	03/06/06	D.D.	LAYOUT/DIA CHANGES
1	12/01/05	M.L.	REVISED SIZE & MATERIAL



MADDEN MANUFACTURING, INC.

Product Catalogue

Metering/Chemical Pumps

Chemical Feed Systems

Pumping Accessories

Mixers

Orifice Meter Blowdown Flow Control

Liquid Sample Coolers

Pump Seal Flush Coolers

Miniature Heat Exchangers

Blowdown Heat Recovery Systems for Boilers

Blowdown Tanks for Boilers

Blowdown Separators for Boilers



JN Series Diaphragm Metering Pumps (10)

5 simplex models, 1-7 GPH capacity, up to 250 psi. These simple, rugged, accurate diaphragm type metering pumps are used in many industrial plants for injecting a controlled flow of highly reactive liquids such as acids, caustics and water treatment chemicals. Heavy duty industrial grade construction means these tough little pumps will deliver many years of trouble free 24-7-365 pumping. Simplex is shown. Duplex and triplex pumps also available.



MF Series Diaphragm Metering Pump (11)

12 simplex models, 5-75 GPH capacity, up to 300 psig. Madden diaphragm metering pumps are designed for tough industrial jobs where chemicals must be pumped 24 hours a day, 365 days a year. Engineered materials are used for the wetted end to pump virtually any chemical, from acids to caustics. Even viscous liquids and suspended solids can be pumped with volume controlled accuracy. Mechanically activated diaphragm type metering pumps are simple and rugged in design. The manual output adjustment knob is located conveniently on the top of the pump body. For automatic output control with a 4-20 mA instrument signal several variable speed drive packages of controller and motor are available. The worm gear reducer has integral steel worm ...



MH Series Diaphragm Metering Pump (5)

5 simplex models, 96-180 GPH capacity, up to 150 psi. Mechanically activated diaphragm type metering pumps are simple and rugged in design. The manual output adjustment knob is located conveniently on the top of the pump body. For automatic output control with a 4-20 mA instrument signal several variable speed drive packages of controller and motor are available. The worm gear reducer has integral steel worm drive shaft and a bronze worm gear, continuously splash lubricated with ISO grade 460 worm gear reducer oil for extended gear and bearing life. Standard motors are 56 frame foot mounted, 1,725 rpm, TEFC. Repetitive accuracy is +/- 1%. Simplex and duplex pumps are available.



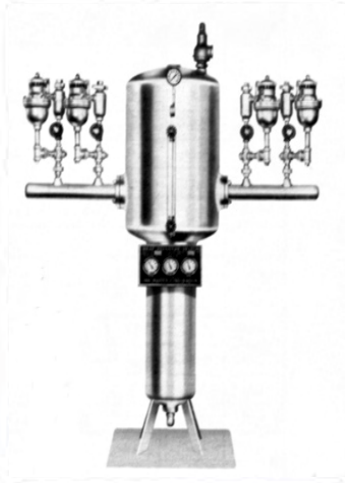
MetriFlow Diaphragm Metering Pumps (16)

3 Series: JN Series (up to 7 GPH), MF Series (up to 75 GPH), and MH Series (up to 180 GPH). These simple, rugged, accurate mechanically actuated diaphragm type metering pumps are used for injecting a controlled flow of highly reactive liquids such as acids, caustics and water treatment chemicals. Heavy duty industrial grade construction means these tough pumps deliver many years of trouble free 24-7-365 pumping. The double diaphragm construction option protects pump from leaking corrosive liquids.

VISIT MADDEN MANUFACTURING ON THEIR WEB SITE AT www.maddenmfg.com

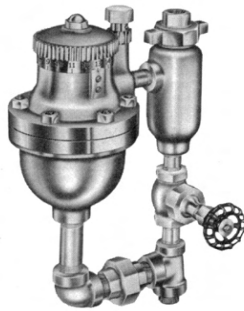
Boiler System Equipment

1



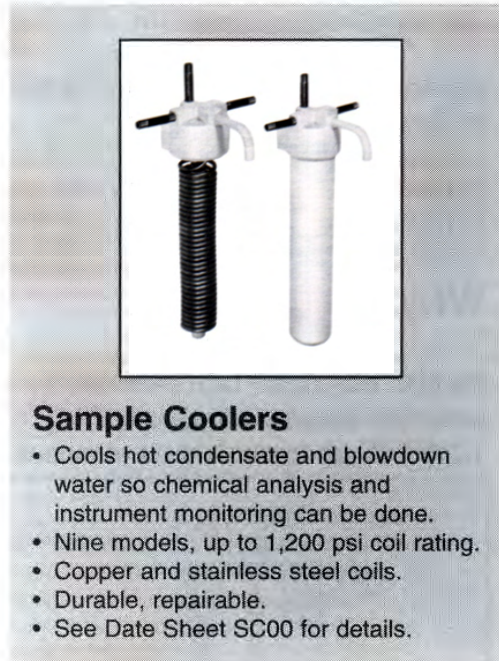
Continuous Boiler Blowdown Heat Recovery Systems

- Recovers 90% of heat that may be lost from continuous top blowdown flow.
- Pays for itself in a matter of months.
- Compact and durable for years of tough service with minimal attention to repairs.
- Complete with drain valve, heat exchanger, flash tank relief valve and gauges.
- 3 different styles to choose from.
- 20 standard models from 1,200 to 50,000 PPH of blowdown flow.
- Hundreds in service, for over 50 years.
- See brochure HX99.



Orifice Meter for Boiler Continuous Blowdown Flow Control

- Precise, repeatable flow control of hot, dirty top blowdown water.
- Two models, 250 psi and 650 psi.
- 17 different set points to control blowdown flow.
- Built-in strainer and flush valve.
- Stays accurate for a minimum of 10 years.
- Better control reduces chemical costs and improves water and steam quality.
- See brochure OM99.



Sample Coolers

- Cools hot condensate and blowdown water so chemical analysis and instrument monitoring can be done.
- Nine models, up to 1,200 psi coil rating.
- Copper and stainless steel coils.
- Durable, repairable.
- See Date Sheet SC00 for details.

Bottom Boiler Blowdown Flash Tanks, Separators and After Coolers

- Rugged equipment to cool intermittent boiler blowdown for discharge to sewer systems
- Enables operator to meet thermal discharge limits
- Standard systems for boilers up to 300 psi include flash separator, aftercooler, temperature gauge and temperature activated cooling water valve
- Custom engineered systems to customer's conditions or specification, see brochure BDS96

Website: www.maddenmfg.com

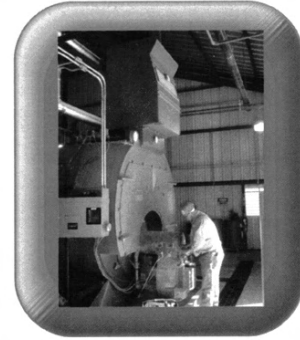
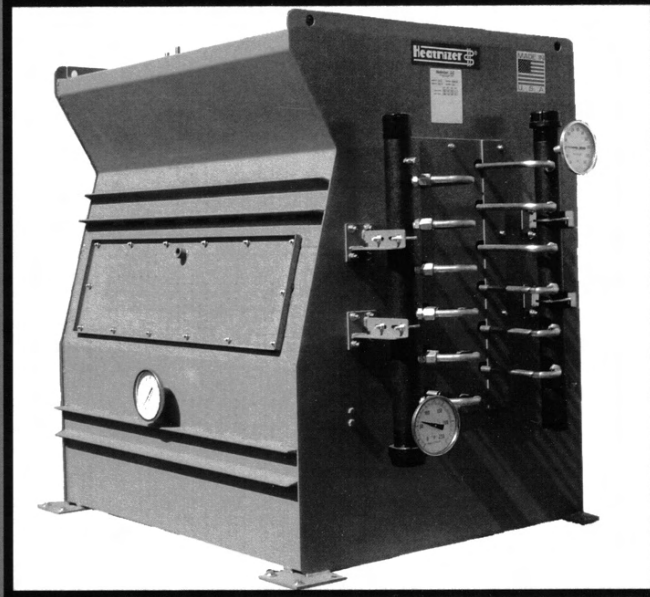
HEATMIZER

1

Heatnizer®

The Future In Boiler Efficiency

**INCREASE BOILER EFFICIENCY
HEAT RECOVERY FOR FORCED DRAFT BOILERS**



HEATMIZER'S PURPOSE

Heat recovery from boiler flue gas provides up to 8% increase in net flue efficiency.

Reduce fuel consumption by reclaiming energy lost in exhaust stack.

Extend performance of existing installation by adding additional heat transfer surface.

Reduce thermal shock to the boiler by preheating the feedwater.

Designed for ease of installation.

Product Features

- Designed for Maximum Savings
- All Stainless Steel Construction for long service life
- Condensing Capability With Water Separation
- Counter Flow Design
- Low Gas Side Pressure Drop
- Individually Removable Exchanger Elements
- Cost Effective Installation Options For Maximum Payback
- Applications for All Types of Boilers
- Designed for Low Temperature Operation
- Process or Domestic Water Heating



Assembled in Ponca City, OK



Heatmizer's twenty years of experience in design, application to all types of boilers, manufacture and service of economizers from 100 to 1600 BHP plus forty-five years of boiler-burner experience combine to give you the most for your money in heat recovery from your boiler.

Designed for Condensing Operation

The Heatmizer concept is to direct the gas stream exiting the boiler through a separate device housing the final heat exchange surface. This concept permits stack temperatures to be reduced to a minimum for maximum overall efficiency without damage to the steel boiler surfaces. Any condensation that occurs is limited to the Heatmizer, which is designed with corrosion resistant materials and a condensate separation and drainage system to provide maximum service under these demanding operating conditions.

Designed with a Built-in Bypass

The Heatmizer can be automatically bypassed if desired by closing the hot side gas damper and opening the cold side gas damper.

Process or Domestic Water Heating — Can limit storage tank temperature during periods of low usage such as weekends or nights.

Feedwater Heating — Aids in "Cold Boiler Start-Up" with firetube boilers during the period of No-Flow.

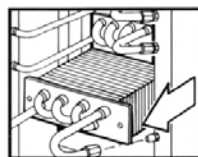
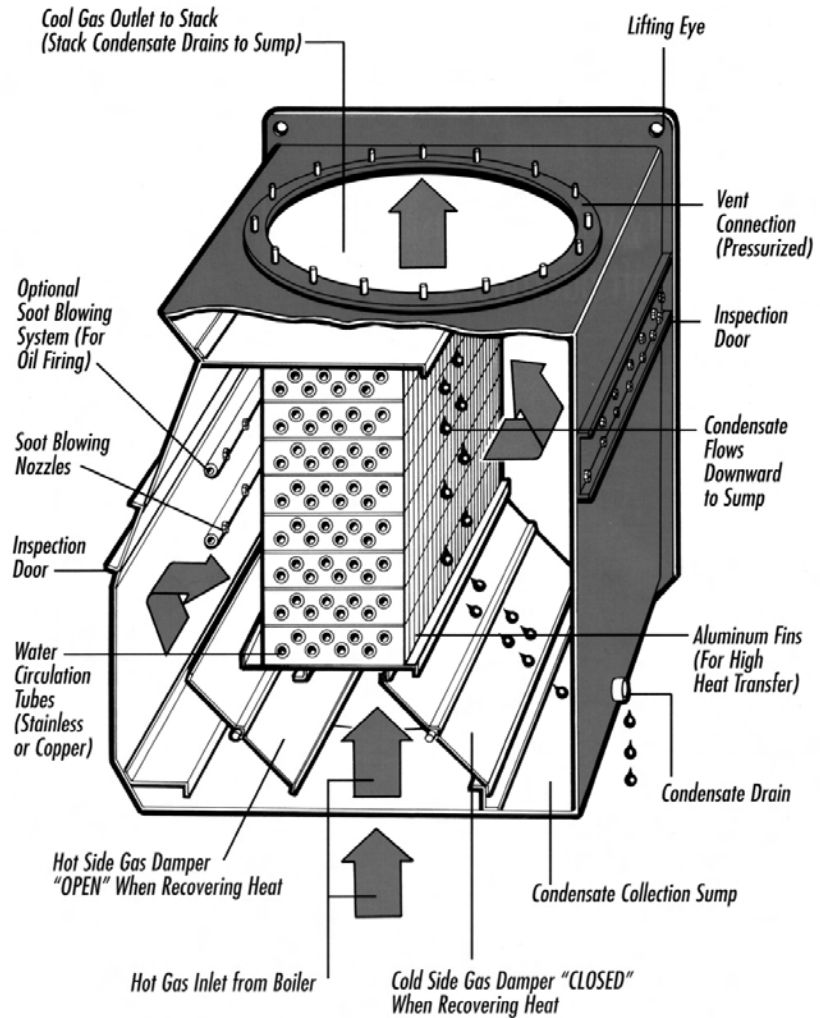
Oil Standby — The bypass is normally opened during periods of firing standby oil (with sulphur content).

Designed for Ease of Installation

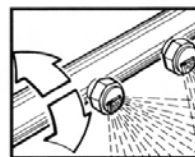
The compact, lightweight design of the Heatmizer makes it possible to locate the unit directly on the boiler. A flanged mounting for the Heatmizer is provided to make a gas-tight pressurized connection to the boiler that provides the majority of support required for the Heatmizer and the vent. Lifting eyes are provided for additional suspension from ceiling beams, and brackets are also included if support to the floor is desired.

Designed for Maximum Savings

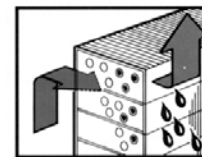
The Heatmizer is designed to maximize savings by utilizing the coldest water available for the heat exchange, even down to winter city water supply temperatures of 45–50°F. With the colder water temperatures the Heatmizer not only recovers the sensible heat from the flue gas leaving the boiler, but also captures the latent heat of the condensate collected as the flue gas is cooled below the dewpoint (135–140°F) for natural gas firing.



Easy Heat Exchanger Element Removal



Optional Soot Blowing System

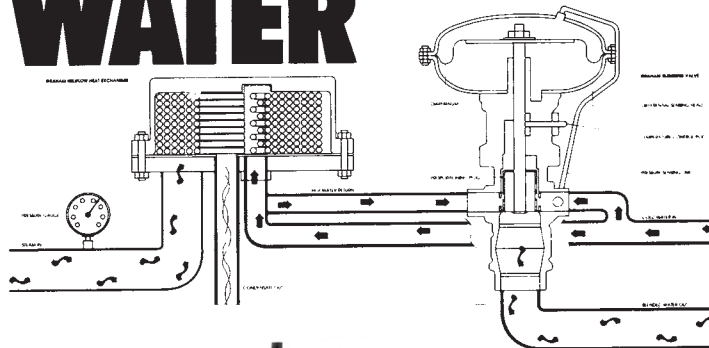


Condensing and Separation

FOR MORE INFORMATION GO TO WWW.HEATMIZER.COM

1

UNLIMITED, ECONOMICAL INSTANT HOT WATER



graham
Vacuum and Heat Transfer

Micro-Mix II[®] Instantaneous Steam Water Heater

**Simple, compact, pre-piped package.
Fail-safe, accurate to +/- 4° F.
No tanks or costly installation.**

Count on the Graham Micro-Mix II for safe, reliable, economical, unlimited hot water on demand anywhere there is 2 to 250 PSIG of steam available. *No safety concerns!* Any failure produces cooler water or none.

From Graham, world leader in vacuum and heat transfer equipment, and inventor of the efficient Heliflow Heat Exchanger.

Features:

- reliable feed-forward design
- up to 40% more efficient than "U" tubes
- needs only 6 sq. ft. floor space
- mount or suspend practically anywhere
- no tanks, wasted space, electrical requirements, costly installation, or worry

*Contact Federal for application
and quotation information*

graham
Vacuum and Heat Transfer