

MIGHTY THERM

LO-NO_x

Copper Finned Gas-Fired
Volume Water Heaters,
Boilers and
Commercial Pool Heaters

Low NO_x,

Quiet, Efficient,

Space-Saving



Mighty Therm Lo-NOx

Greater energy efficiencies as high as 84% are achieved through state-of-the-art design. Efficient heat transfer and reduced standby losses result in lower operating costs.

Design-certified by IAS (International Approval Services, a joint venture of American Gas Association and Canadian Gas Association) under ANSI Standard Z21.13. Water heaters may be specified for use with natural or propane gas.

Indoor and outdoor models are available for maximum application flexibility.

Working pressure of 160 psi is standard in accordance with Section IV ASME Boiler and Pressure Vessel Code. Units are factory tested per this ASME code and are registered with the National Board of Boiler and Pressure Vessel Inspectors or the applicable Canadian provincial jurisdiction.

Integral finned copper tubes meeting ASME specification SB 75

are rolled directly into headers. Heat exchanger baffles and an eight-fins-per-inch tubing configuration extract combustion heat with maximum efficiency.

Heat exchanger headers conform to Article 2, Part HC of ASME Code. External header covers are field removable for complete inspection of tubing and header passages. Heat exchanger is replaceable without disassembly of burners or combustion chamber.

Pressure relief valve is ASME rated and is selected to provide discharge capacity in excess of unit heating input.

Combustion chamber is Laars' lightweight cast refractory utilizing calcium aluminate cement with 2000°F (1093°C) working temperature.

Burners are atmospheric type constructed of AISI alloy 430 (sizes 175-1825) or AISI 439 (sizes 2000-5000) stainless steel.

Controls meet requirements of ANSI Standard Z21.13 and the

Canadian Gas Association standards and include ignition safeguard, manual reset high limit, operating temperature control, gas pressure regulator, redundant electric gas valve (optional in Canada), water flow sensing, and manual gas shut-off valve. Standard control systems operate on 24 VAC power from class 2 transformer. Ignition safeguard reacting to flame failure in less than 0.8 second is standard on units above 400,000 BTU/hr. (117.2 kW).

Chassis and jacket parts are of galvanized steel meeting ASTM Standard for G90 coating. Exterior is finished with acrylic paint, thermoset at 325°F (163°C).

The warranty provides complete protection: one year on materials and workmanship for controls, combustion chamber, pump and tank (when provided); five year warranty on heat exchanger tubes (warranted against thermal shock for the life of the boiler); and five years on all other parts.

Models Available

Model VW-PW

Volume Water Heater

Completely assembled at the factory and simple to install. Sizes 250,000 to 400,000 BTU/h (73 to 117 kW) are combination indoor/outdoor. Sizes 500,000 to 1,825,000 BTU/h (147 to 535 kW) can be ordered either indoor or outdoor. Both series are used in conjunction with storage wherever a large volume of hot water is required, such as apartments/condominiums, hotels, schools, hospitals and laundries.

Model HH-PH

Hydronic Boiler

Fully assembled and easy to install. Convertible indoor/outdoor sizes from 250,000 to 400,000 BTU/h (73 to 117 kW) available, and sizes from 500,000 to 1,825,000 BTU/h (147 to 535 kW) may be ordered as either indoor or outdoor configurations. Multiple boilers can be installed for maximum efficiency.

Model AP

Pool Heating Boiler

Compact, pool heating boilers designed for commercial, institutional and large residential pools where economical performance and rapid heat-up are needed. Available as indoor or outdoor models, from 500,000 to 1,825,000 BTU/h (147 to 535 kW).

Dimensional Data

Indoor Size	Input ¹		Output ¹		IBR Net Rating ¹		Gas Connection Size - inches NPT Natural ⁴	Water Conn. Size inches NPT	Dimensions ¹						Shipping Weight ²			
	MBTU/h	kW	MBTU/h	kW	MBTU/h	kW			A inches	A cm	H inches	H cm	H inches	H cm	V inches	V cm	lbs.	kgs
250	250	73	200	59	176	52	¾	1½	22½	57	18¼	46	25¼	64	7	18	255	116
400	400	117	324	95	282	83	¾	1½	31¾	81	21½	55	27½	70	9	23	360	163

- Notes:** 1. Dimensions are nominal.
2. Units with pumps: Add 25 lbs.

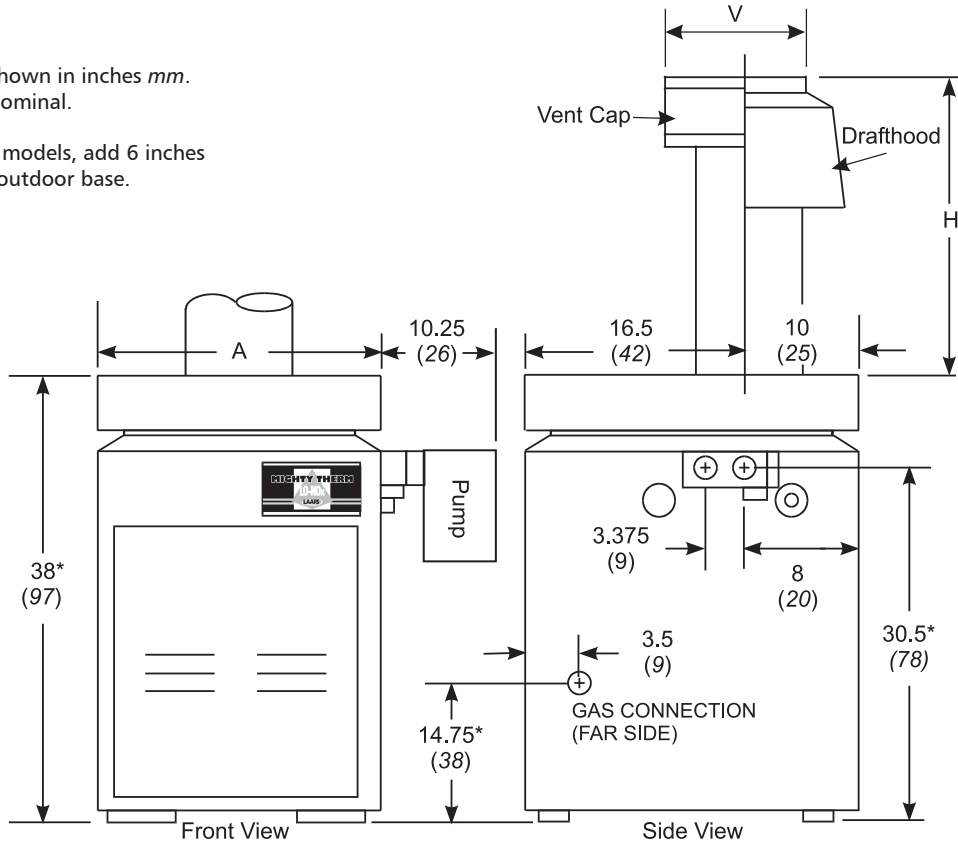
Model PW	Input ¹		Output ¹		IBR Net Rating ¹		Gas Connection Size - inches NPT Natural ⁴	Water Conn. Size inches NPT	Dimensions ¹						Shipping Weight ²			
	MBTU/h	kW	MBTU/h	kW	MBTU/h	kW			A inches	A cm	B inches	B cm	C ³ inches	C ³ cm	V ³ inches	V ³ cm	lbs.	kgs
500	500	147	410	120	325	95	1	2	33⅝	85	45	114	23⅝	60	10	25	800	363
715	715	209	586	172	504	148	1	2	44¼	112	55½	141	22⅝	58	12	31	960	436
1010	1010	296	828	243	711	208	1¼	2½	58	147	69¼	176	20⅝	52	16	41	1130	513
1430	1430	419	1173	344	1007	295	1¼	2½	76	193	87¼	222	19⅝	50	18	46	1400	636
1825	1825	535	1497	439	1285	377	1½	2½	92¼	234	103½	263	19⅝	50	18	46	1535	697

- Notes:** 1. Dimensions are nominal.
2. Add 15% for outdoor units.
3. C and V dimensions apply to indoor units only.

Sizes 250-400

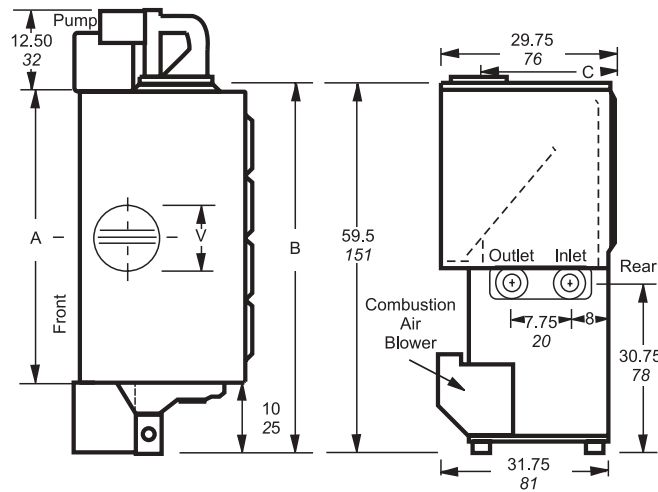
Dimensions shown in inches *mm*.
Dimensions nominal.

*For outdoor models, add 6 inches (15.2cm) for outdoor base.



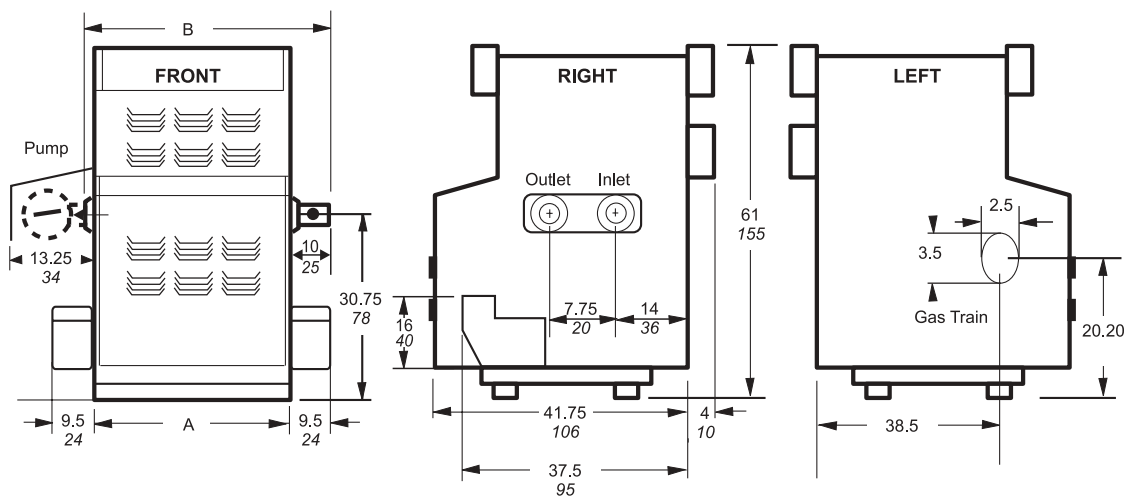
Dimensional Diagrams

Sizes 500-1825



Dimensions shown in inches *mm*.

Indoor



Outdoor

Recovery Tables

Required Water Temperature Rise

Size	40°F	4°C	50°F	10°C	60°F	16°C	70°F	21°C	80°F	27°C	90°F	32°C	100°F	38°C	120°F	49°C	140°F	60°C
	gph	mL/s	gph	mL/s	gph	mL/s	gph	mL/s	gph	mL/s	gph	mL/s	gph	mL/s	gph	mL/s	gph	mL/s
250	600	333	480	267	400	222	343	191	300	167	267	148	240	133	200	111	172	96
400	960	533	768	427	640	356	548	304	480	267	427	237	384	213	320	178	275	153
500	1230	4662	984	3729	820	3108	703	2664	615	2331	547	2073	492	1865	410	1554	351	1330
715	1758	6663	1406	5329	1172	4442	1005	3809	879	3331	781	2560	703	2664	586	2221	502	1903
1010	2484	9414	1987	7531	1656	6276	1419	5378	1242	4707	1104	4184	994	3767	828	3138	710	2691
1430	3519	13,337	2815	10,669	2346	8891	2011	7622	1760	6670	1564	5928	1408	5336	1173	4446	1005	3809
1825	4491	17,021	3593	13,617	2994	11,347	2566	9725	2246	8512	1996	7565	1796	6807	1497	5674	1283	4863

Recovery rates rounded to nearest gallon/liter.

Features

- Efficient and environmentally friendly
- Sizes from 250,000 to 1,825,000 BTU/h
- As low as 10 ppm NOx
- Indoor/Outdoor units available
- Meets SCAQMD Rule 1146.2
- VCAPC code compliant
- Design-approved by IAS (CSA)
- Added combustion air blower
- Low emission burners
- Hot surface ignition (Systems 21 & 22)
- Natural gas only
- Standard installation
- Category 1 venting (natural draft)
- Two-stage firing available on 500-1825



Standard Equipment

- ASME 160 lb. working pressure heat exchanger
- 24V control system
- Operating gas valve/pressure regulator
- Water flow sensing device
- Removable burner tray
- Glass lined cast iron headers
- Covered control box
- Redundant safety gas valve
- Operating control
- Manual reset high limit
- Manual shut-off valve
- Low emission stainless steel burners
- External water side gaskets
- Non-combustible base
- Pressure relief valve
- 115/24V transformer
- Terminal strip
- On / off toggle switch
- 2 Amp fuse
- Power on light
- Hot surface ignition
- EM2 (energy management monitor)

Sizes 500-1825 include:

- Built-in drafthood
- Dual combustion air blowers
- Bronze flanged connections
- Dry contact for lock-out monitoring

Minimum Clearances

From Adjacent Construction

Recommended Minimum Clearance From	Sizes 250-400				Sizes 500-1825			
	Indoor		Outdoor		Indoor		Outdoor	
	inches	cm	inches	cm	inches	cm	inches	cm
Top	37	94	Unobstructed		30	76	—	—
Connection Side	12	30	Unobstructed		12	31	24	61
Opposite Side	6	15	6	15	6	15	24	61
Front*	18	46	Unobstructed*		Alcove		—	—
Rear	6	15	6	15	8	20	24	61
Vent Pipe**	6	15	—	6	6	15	—	—

Note: Base for combustible flooring standard on outdoor sizes 500 to 1825. Indoor sizes 500 to 1825 must be installed on non-combustible floors or with base for combustible floors (Laars' optional base A.G.A. design certified).

*At least 48" (122cm) clearance should be provided in front of the boiler for maintenance accessibility (removal of burners, etc.).

**1" (25mm) if double wall vent is used.

Pump Requirements Guide

A suitable pump must be field-provided for circulation of water between Model VW heater and the storage tank(s). The pump must be sized to provide adequate temperature rise through the heater, while producing correct flow for prevailing water hardness conditions.

Specifications in this table include allowance for 30 ft. (9.1m) of piping and normal fittings between heater and tank. This allowance is based on flange connection size (see chart).

Size		Flow Rate			Head Loss			Flow Rate			Head Loss			Water Conn. Size	Temp. Rise Across Heater											
															Indoor			Outdoor								
Indoor	Outdoor	gpm			ft.			l/s			m			inches	°F °C	°F °C	°F °C	°F °C	°F °C	°F °C						
		S	N	H	S	N	H	S	N	H	S	N	H		S	N	H									
250	250	22	34	46	6.0	13.6	23.8	1.4	2.1	2.9	1.8	4.1	7.3	1½	18	10	12	7	9	5	18	10	12	7	9	5
400	400	22	34	46	6.3	14.5	25.6	1.4	2.1	2.9	1.9	4.4	7.8	1½	29	16	19	11	14	8	29	16	19	11	14	8
500	500	45	68	90	5.0	9.9	15.7	2.8	4.3	5.7	1.5	3.0	4.8	2	17	9	11	6	8	4	17	9	11	6	8	4
715	715	45	68	90	5.3	11.0	17.8	2.8	4.3	5.7	1.6	3.4	5.5	2	24	13	16	9	12	7	24	13	16	9	12	7
1010	1010	45	68	90	3.9	7.5	11.7	2.8	4.3	5.7	1.2	2.3	3.6	2½	35	19	23	13	18	13	35	19	23	13	18	10
1200	1200	68	68	90	7.8	7.8	12.2	4.3	4.3	5.7	2.4	2.4	3.7	2½	27	15	27	15	21	12	27	15	27	15	21	12
1430	1430	68	68	90	8.1	8.1	12.6	4.3	4.3	5.7	2.5	2.5	3.8	2½	32	18	32	18	24	13	32	18	32	18	24	13
1825	1825	90	90	90	13.5	13.5	13.5	5.7	5.7	5.7	4.1	4.1	4.1	2½	30	17	30	17	30	17	30	17	30	17	30	17

Sizes 1200, 1430, and 1825 (with soft water) must be ordered with cupro-nickel heat exchanger tubes to prevent erosion.

KEY: Water category grain hardness per gallon. S=Soft - 1 through 7.5; N = Normal - 7.6 through 17; H = Hard - Over 17.

17.1 parts per million = 1 grain hardness per gallon.

Pump Electrical Data - PW/PH

Sizes	Water Category					
	Power (HP)			Current (Amps)		
	Soft	Normal	Hard	Soft	Normal	Hard
250	1/12	1/12	1/12	1.62	1.62	1.62
400	1/6	1/6	1/6	2.15	2.15	2.15
500-715	1/3	1/3	3/4	7.2	7.2	13.9
1010-1430	1/3	1/2	3/4	7.2	7.2	13.9
1825	3/4	3/4	3/4	13.9	13.9	13.9

Data is shown for 115 volt single phase motors.



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