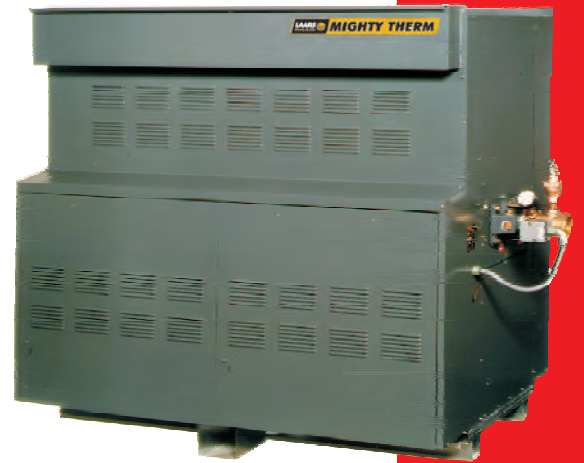


# ***MIGHTY THERM***

Copper Finned  
Gas Fired Hydronic Boiler



---

***Powerful,***

---

***Efficient,***

---

***Reliable and***

---

***Economical***

---

**LAARS**   
Heating Systems Company

A subsidiary of **BRADFORD WHITE**  
CORPORATION



## Mighty Therm Features

**Energy efficiencies as high as 82%** 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. Boilers 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 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 heat 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 operates 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 limited warranty** provides one year on materials and workmanship for controls, combustion chamber, pump and tank (if provided). Refer to the Warranty Sheet with each unit for further details.

## Motor Electrical Data

Factory Provided Pumps - Standard PH Boilers

PH Size	Power (HP)	Voltage/Phase	Current (Amps)
175	1/25	115-1	0.8
250	1/12	11	5-1 1.6
325-400	1/6	115-1	2.1
500-850	1/3	115-1	5.4
1010-1200	1/2	115-1	5.8
1430-1825	3/4	115-1	8.8

## Minimum Clearances from adjacent construction

Recommended Minimum Clearance From	Sizes 175-400		Sizes 500-1825				Sizes 2000-5000					
	Indoor inches	Outdoor cm	Indoor inches	Outdoor cm	Indoor inches	Outdoor cm	Indoor inches	Outdoor cm	Indoor inches	Outdoor cm		
Top	37	94	Unobstructed		30	76	Unobstructed		24	61	Unobstructed	
Connection Side	12	31	Unobstructed		12	31	24	61	24	61	24	61
Opposite Side	6	15	6	15	6	15	24	61	24	61	24	61
Front*	18	46	Unobstructed*		24	61	Unobstructed*		48	122	Unobstructed*	
Rear	6	15	6	15	8	20	24	61	24	61	24	61
Vent	**6	15	—		**6	15	—		**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). Indoor sizes 2000-5000 and outdoor sizes 2200-4500 require installation on non-combustible floors.

\*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.

# Dimensional Data

## Indoor Models

Indoor Size	Input <sup>1</sup>		Output <sup>1</sup>		IBR Net Rating <sup>1</sup>		Gas Connection <sup>2</sup>		Water Conn. <sup>2</sup> Size inches NPT	Dimensions <sup>2,5</sup> - inches cm								Shipping Weight <sup>3</sup>	
	MBTU/h	kW	MBTU/h	kW	MBTU/h	kW	Natural <sup>4</sup>	LP <sup>4</sup>		A	B	C	V	lbs	kgs				
175	175	51	144	42	125	37	1/2-3/4	1/2	1 1/2	18	46	27	69	23 1/2	60	6	15	255	116
250	250	73	205	60	178	52	3/4	1/2	1 1/2	22 1/2	57	31 1/2	80	24 3/4	63	7	18	255	116
325	325	95	267	78	232	68	3/4	1/2	1 1/2	26 3/4	68	35 3/4	91	25 7/8	66	8	20	325	148
400	399	117	327	96	285	83	3/4	1/2	1 1/2	31 3/4	81	40 3/4	104	26 7/8	68	9	23	360	163
500	500	147	410	120	357	104	1	3/4-1	2	33 3/4	86	45 1/4	115	23 3/4	60	10	25	612	278
600	600	176	492	144	428	125	1	3/4-1	2	38 3/4	98	50 1/4	128	22 3/4	58	12	31	702	319
715	715	210	586	172	510	149	1	3/4-1	2	44 1/4	112	55 3/4	142	22 3/4	58	12	31	750	340
850	850	249	697	204	606	178	1-1 1/4	3/4-1 1/4	2	50 3/4	129	62 1/4	158	21 3/4	55	14	36	830	377
1010	1010	296	828	243	720	211	1 1/4	1-1 1/4	2 1/2	58	147	69 1/2	177	20 3/4	53	16	41	945	429
1200	1200	352	984	288	856	251	1 1/4	1-1 1/4	2 1/2	66 1/4	168	77 3/4	198	20 3/4	53	16	41	995	451
1430	1430	419	1173	344	1020	299	1 1/4	1 1/4	2 1/2	76	193	87 1/2	222	19 3/4	50	18	46	1080	490
1670	1670	489	1369	401	1191	349	1 1/4	1 1/4	2 1/2	85 1/2	217	97	246	19 3/4	50	18	46	1175	533
1825	1825	535	1497	438	1301	381	1 1/4	1 1/4	2 1/2	92 1/4	234	103 3/4	264	19 3/4	50	18	46	1270	576
2000	2000	586	1640	481	1426	418	1 1/2	1 1/4-1 1/2	4	55 1/2	140	73	185	24 1/2	62	22	56	1815	823
2450	2450	718	2009	589	1747	512	1 1/2-2	1 1/2	4	65 1/2	166	83	211	24 1/2	62	24	61	1950	885
3050	3050	894	2501	733	2175	637	2	1 1/2	4	78	198	95 1/2	243	24 1/2	62	26	66	2100	953
3500	3500	1026	2870	841	2496	731	2	1 1/2	4	88	224	105 1/2	268	24 1/2	62	28	71	2237	1016
4050	4050	1186	3321	973	2888	846	2-2 1/2	2	4	100 1/2	255	118	300	24 1/2	62	30	76	2555	1160
4500	4500	1318	3690	1081	3209	940	2 1/2	2	4	110 1/2	281	128	325	24 1/2	62	32	81	2750	1249
5000	5000	1465	4100	1201	3565	1045	2 1/2	2	4	123	312	140 1/2	357	24 1/2	62	34	83	3050	1385

## Outdoor Models

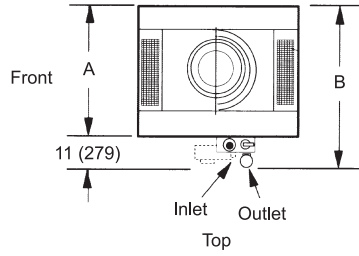
Outdoor Size	Input <sup>1</sup>		Output <sup>1</sup>		IBR Net Rating <sup>1</sup>		Gas Connection <sup>2</sup>		Water Conn. <sup>2</sup> Size inches NPT	Dimensions <sup>2</sup> - inches cm								Shipping Weight <sup>3</sup>	
	MBTU/h	kW	MBTU/h	kW	MBTU/h	kW	Natural <sup>4</sup>	LP <sup>4</sup>		A	B	C	V	lbs	kgs				
175	175	51	144	42	125	37	1/2-3/4	1/2	1 1/2	18	46	27	69	14 1/16	36	6	15	255	116
250	250	73	205	60	178	52	3/4	1/2	1 1/2	22 1/2	57	31 1/4	79	18 5/8	47	7	18	285	129
325	325	95	267	78	232	68	3/4	1/2	1 1/2	26 3/4	68	35 3/4	91	19 3/16	49	8	21	325	148
400	399	117	327	96	285	83	3/4	1/2	1 1/2	31 3/4	81	40 3/4	104	22 5/8	58	9	23	360	163
500	500	147	410	120	357	104	1	3/4	2	33 3/4	86	45 1/4	115	—	—	—	—	751	341
600	600	176	492	144	428	125	1	3/4	2	38 3/4	98	50 1/4	128	—	—	—	—	821	373
715	715	210	586	172	510	149	1	3/4	2	44 1/4	112	55 3/4	142	—	—	—	—	906	411
850	850	249	697	204	606	178	1	3/4	2	50 3/4	129	62 1/4	158	—	—	—	—	1000	454
1010	1010	296	828	243	720	211	1 1/4	1	2 1/2	58	147	69 1/2	177	—	—	—	—	945	429
1200	1200	352	984	288	856	251	1 1/4	1	2 1/2	66 1/4	168	77 3/4	198	—	—	—	—	1185	538
1430	1430	419	1173	344	1020	299	1 1/4	1 1/4	2 1/2	76	193	87 1/2	222	—	—	—	—	1330	604
1670	1670	489	1369	401	1191	349	1 1/4	1 1/4	2 1/2	85 1/2	217	97	246	—	—	—	—	1490	676
1825	1825	535	1497	438	1301	381	1 1/4	1 1/4	2 1/2	92 1/4	234	103 3/4	264	—	—	—	—	1630	740
2200	2205	646	1808	530	1572	461	1 1/2-2	1 1/2	4	65 1/2	166	83	211	—	—	—	—	2300	1044
2800	2745	804	2251	660	1957	573	1 1/2-2	1 1/2	4	78	198	95 1/2	243	—	—	—	—	2670	1212
3200	3150	923	2583	757	2246	658	2	1 1/2	4	88	224	105 1/2	268	—	—	—	—	2750	1249
3600	3645	1068	2989	876	2599	762	2-2 1/2	2	4	100 1/2	255	118	300	—	—	—	—	3175	1441
4000	4050	1187	3321	973	2888	846	2 1/2	2	4	110 1/2	281	128	325	—	—	—	—	3380	1535
4500	4500	1319	3690	1081	3209	940	2 1/2	2	4	123	312	140 1/2	357	—	—	—	—	3790	1721

- Notes:**
- Input and output must be derated 4% per 1000 feet above sea level when installed above 2000 feet altitude.
  - Dimensions are nominal.
  - Units with pumps: Add 20 lbs. (9 kg) to sizes 175-400 and 55 lbs. (25 kg) to sizes 500-1825.
  - When two gas connection sizes are shown, the smaller applies to the standard gas train, while the larger applies to optional trains. Consult factory for exact specifications.
  - Vent damper required for only U.S. indoor installations of sizes 175-250. For vent dimension without vent damper add 5" (127mm) for size 175. Deduct 5 1/4" (133mm) for size 250.

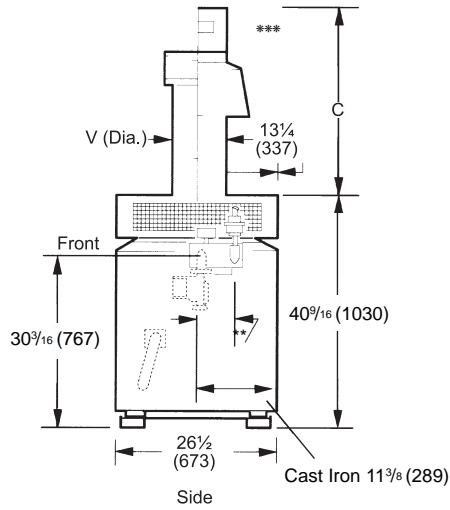
# Dimensional Diagrams

## Sizes 175-400

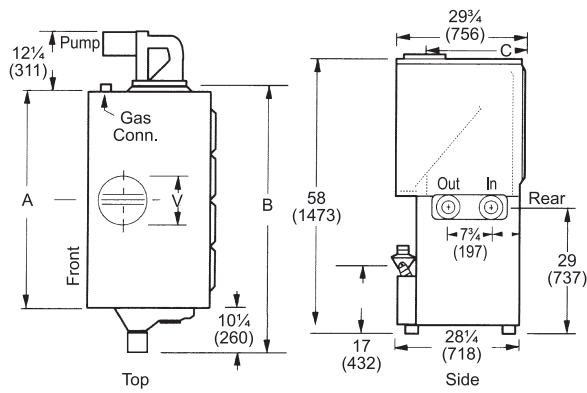
### Indoor/Outdoor



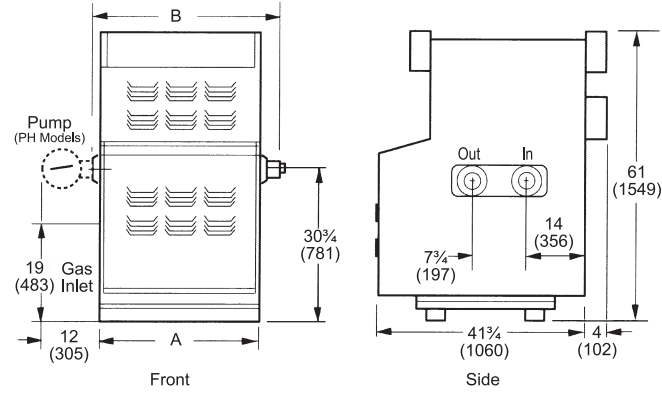
\*\* Cast Iron 5 $\frac{1}{4}$ , Bronze 2 $\frac{3}{4}$   
 \*\*\* Vent damper required only for U.S. indoor installations of sizes 175-250



## Sizes 500-1825

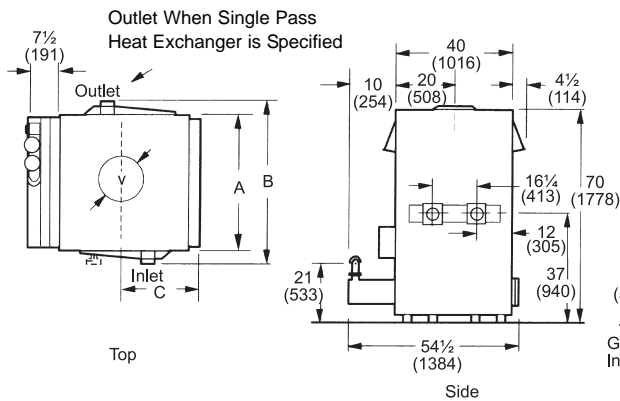


### Indoor



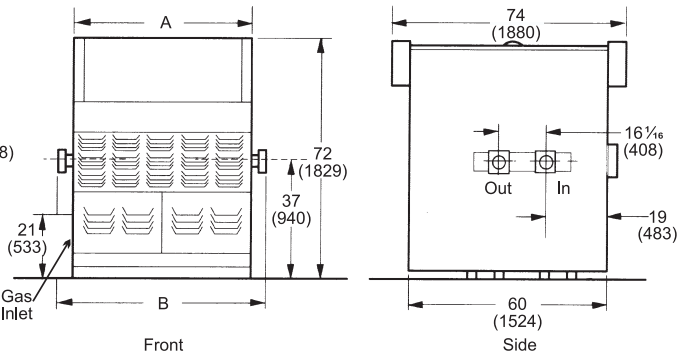
### Outdoor

## Sizes 2000-5000



### Indoor

## Sizes 2200-4500



### Outdoor

## Design Advantages

### Standard Features

- 160 PSI working pressure.
- Constructed to Section IV, ASME Boiler and Pressure Vessel Code.
- Factory mounted pump (sizes 175-1825, Model PH).
- Design certified and tested by I.A.S. (A.G.A. & C.G.A.)
- Meets requirements of ASHRAE Standard 90.1.
- Electronic flame supervision.
- Natural or propane gas.
- Electronic ignition.
- On/off switch with indicator light.
- Fused control circuit.
- Non-combustible base – standard on all sizes 175-400 and outdoor sizes 500-1825.

### Available Firing Modes

- **On/Off:** Standard on sizes 175-400. Available on all sizes.
- **Two Stage:** Standard on sizes 500-5000. Available on all sizes.
- **Four Stage:** Available on sizes 500-5000.
- **Motorized Modulation:** Available on sizes 500-5000.
- **Mechanical Modulation:** Available on sizes 325-1825.
- **Motorized On/Off:** Available on sizes 500-5000.
- **Motorized 2-Stage:** Available on sizes 500-5000.

### Optional Equipment

#### GAS TRAIN:

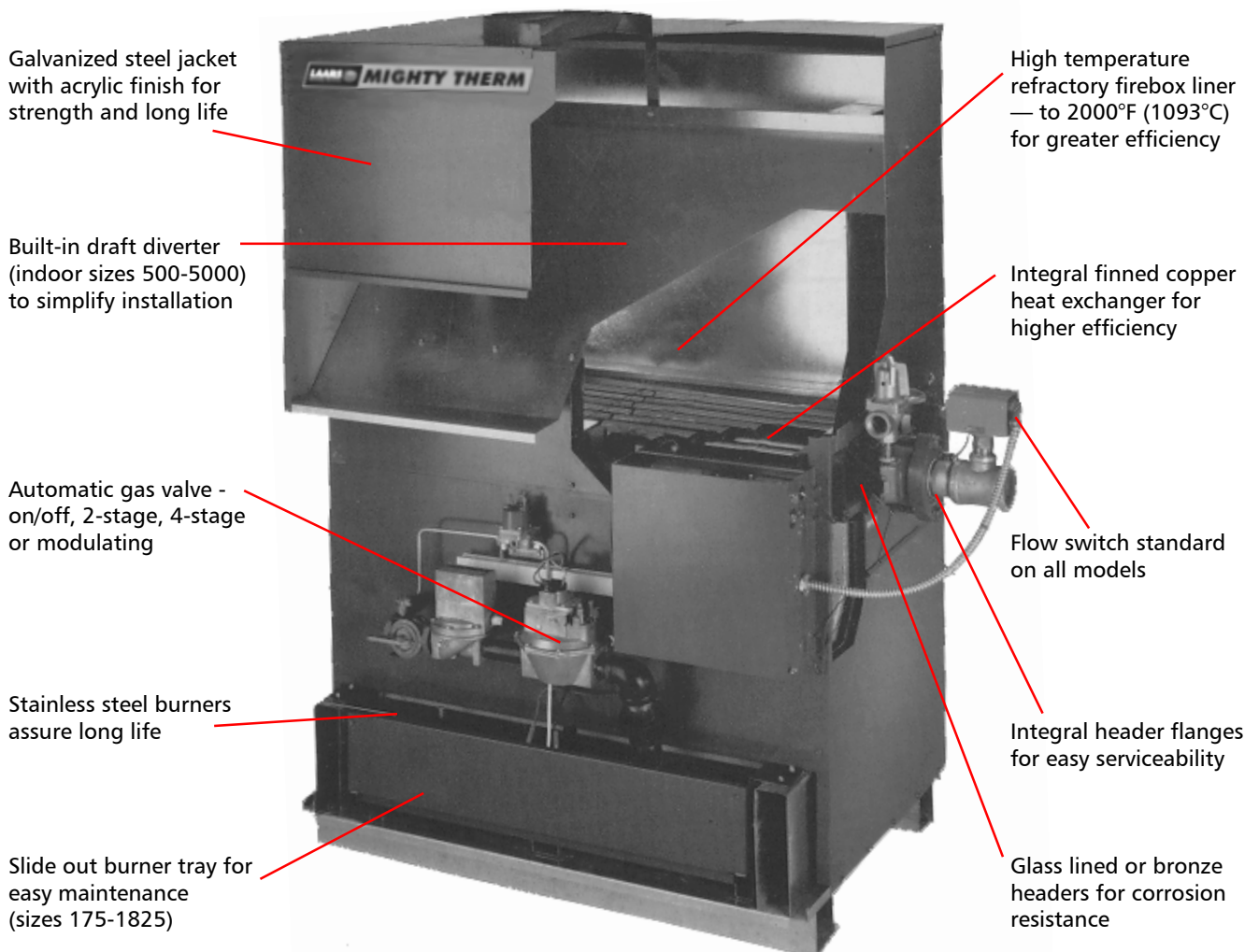
- Additional manual shutoff.
- Additional safety valve.
- Motorized safety valve (available with proof of closure).
- High/low gas pressure switches.
- Normally open vent valve.
- Leak test valve.

#### OUTDOOR RESET CONTROLS:

- On/off (1:1).
- 2-stage (1:1 or 1:1.5).
- Motorized modulation (1:1).
- MightyMatic 3 Sequencer — 4-stage.
- MightyMatic 4 Sequencer — 8-stage.

#### CONTROLS:

- 100% lockout.
- Low water cutoff — with manual reset and test button.
- Low temperature aquastat — on/off, or 2-stage.
- Automatic reset high limit.
- EM<sup>2</sup> — Energy Management Monitor.



# Water Flow, Temperature Rise and Pressure Drop

Indoor Size	Outdoor Size	20°F 11°C Hd Loss				25°F 14°C Hd Loss				30°F 17°C Hd Loss				35°F 19°C Hd Loss			
		GPM	Ft	l/s	m	GPM	Ft	l/s	m	GPM	Ft	l/s	m	GPM	Ft	l/s	m
175	175	14	0.5	0.9	0.2	11	0.6	0.7	0.2	9	0.5	0.6	0.2	8	0.3	0.5	0.1
250	250	20	2.1	1.3	0.6	16	1.2	1.0	0.4	13	0.8	0.8	0.2	11	0.6	0.7	0.2
325	325	25	3.4	1.6	1.0	20	2.1	1.3	0.6	17	1.4	1.1	0.4	15	1.1	0.9	0.3
400	400	31	5.2	2.0	1.6	25	3.4	1.6	1.0	21	2.3	1.3	0.7	18	1.7	1.1	0.5

500	—	38	1.4	2.4	0.4	31	1.1	2.0	0.3	26	0.9	1.6	0.3	22	0.6	1.4	0.2
—	500	41	1.7	2.6	0.5	33	1.1	2.1	0.3	27	0.9	1.7	0.3	23	0.7	1.5	0.2
600	—	47	1.8	3.0	0.5	37	1.4	2.3	0.4	31	1.2	2.0	0.4	27	0.8	1.7	0.2
—	600	49	2.3	3.1	0.7	39	1.6	2.5	0.5	32	1.1	2.0	0.3	28	0.9	1.8	0.3
715	—	56	2.5	3.5	0.8	45	1.9	2.8	0.6	37	1.5	2.3	0.5	32	1.0	2.0	0.3
—	715	58	3.2	3.7	1.0	47	2.2	3.0	0.7	39	1.6	2.5	0.5	33	1.1	2.1	0.3
850	—	66	3.4	4.2	1.0	53	2.5	3.3	0.8	44	2.0	2.8	0.6	38	1.4	2.4	0.4
—	850	69	3.6	4.4	1.1	55	3.1	3.5	0.9	46	2.2	2.9	0.7	39	1.6	2.5	0.5
1010	—	79	4.7	5.0	1.4	63	3.4	4.0	1.0	53	2.7	3.3	0.8	45	1.9	2.8	0.6
—	1010	82	5.0	5.2	1.5	66	3.6	4.2	1.1	55	3.1	3.5	0.9	47	2.2	3.0	0.7
1200	—	94	6.5	5.9	2.0	75	4.8	4.7	1.5	62	3.7	3.9	1.1	53	2.6	3.3	0.8
—	1200	98	6.9	6.2	2.1	78	4.9	4.9	1.5	65	3.6	4.1	1.1	56	3.1	3.5	0.9
1430	—	112	8.9	7.1	2.7	89	6.5	5.6	2.0	74	5.0	4.7	1.5	64	3.5	4.0	1.1
—	1430	117	9.5	7.4	2.9	93	6.7	5.9	2.0	78	5.0	4.9	1.5	67	3.7	4.2	1.1
1670	—	•	•	•	•	102	8.8	6.4	2.7	85	6.7	5.4	2.0	73	4.7	4.6	1.4
—	1670	•	•	•	•	109	9.1	6.9	2.8	91	6.8	5.7	2.7	78	5.0	4.9	1.5
1825	—	•	•	•	•	114	10.0	7.2	3.0	95	8.0	6.0	2.4	81	5.5	5.1	1.7
—	1825	•	•	•	•	119	10.4	7.5	3.2	99	8.3	6.2	2.5	85	5.7	5.4	1.7

2000-1P	—	164	3.9	10.3	1.2	131	3.6	8.3	1.1	109	1.8	6.9	0.5	94	0.7	5.9	0.2
2P	—	164	10.5	10.3	3.2	131	7.4	8.3	2.3	109	4.9	6.9	1.5	94	3.0	5.9	0.9
2450-1P	—	201	5.9	12.7	1.8	161	3.9	10.2	1.2	134	3.8	8.5	1.2	115	2.3	7.3	0.7
2P	—	201	16.4	12.7	5.0	161	10.2	10.2	3.1	134	7.7	8.5	2.3	115	5.7	7.3	1.7
—	2200-1P	179	4.8	11.3	1.5	143	3.8	9.0	1.2	119	2.6	7.5	0.8	102	1.8	6.4	0.5
—	2P	179	13.0	11.3	4.0	143	8.5	9.0	2.6	119	6.1	7.5	1.9	102	4.5	6.4	1.4
3050-1P	—	250	9.3	15.8	2.8	200	5.9	12.6	1.8	167	4.5	10.5	1.4	143	3.8	9.0	1.2
2P	—	•	•	•	•	200	16.4	12.6	5.0	167	12.5	10.5	3.8	143	8.5	9.0	2.6
—	2800-1P	222	7.4	14.0	2.3	178	5.0	11.2	1.5	148	4.0	9.3	1.2	127	3.0	8.0	0.9
—	2P	222	18.2	14.0	5.5	178	13.8	11.2	4.2	148	9.3	9.3	2.8	127	6.7	8.0	2.0
3500-1P	—	284	12.0	17.9	3.7	230	8.7	14.5	2.7	189	5.7	11.9	1.7	164	3.9	10.3	1.2
2P	—	•	•	•	•	•	•	•	•	189	16.8	11.9	5.1	164	10.5	10.3	3.2
—	3200-1P	255	10.2	16.1	3.1	204	6.8	12.9	2.1	170	4.3	10.7	1.3	146	3.1	9.2	0.9
—	2P	•	•	•	•	204	18.1	12.9	5.5	170	12.0	10.7	3.7	146	8.3	9.2	2.5
4050-1P	—	332	17.2	20.9	5.2	266	11.9	16.8	3.6	222	8.1	14.0	2.5	190	5.8	12.0	1.8
2P	—	•	•	•	•	•	•	•	•	222	24.0	14.0	7.3	190	16	12.0	4.9
—	3600-1p	295	14.2	18.6	4.3	236	9.3	14.9	2.8	197	6.3	12.4	1.9	169	4.6	10.7	1.4
—	2P	•	•	•	•	•	•	•	•	197	17.8	12.4	5.4	169	12.7	10.7	3.9
4500-1P	—	369	21.75	23.3	6.6	295	13.2	18.6	4.0	246	10.0	15.5	3.0	211	7.0	13.3	2.1
2P	—	•	•	•	•	•	•	•	•	•	•	•	•	211	20	13.3	6.1
—	4000-1P	328	17.0	20.7	5.2	262	11.1	16.5	3.4	219	7.7	13.8	2.3	187	5.5	11.8	1.7
—	2P	•	•	•	•	•	•	•	•	219	20.8	13.8	6.3	187	15.7	11.8	4.8
5000-1P	—	410	27.0	25.9	8.2	328	16.8	20.7	5.1	273	13.0	17.2	4.0	234	9.0	14.8	2.7
2P	—	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
—	4500-1P	365	21.3	23.0	6.5	292	14.3	18.4	4.4	243	9.9	15.3	3.0	208	7.1	13.1	2.2
—	2P	•	•	•	•	•	•	•	•	•	•	•	•	208	19.5	13.1	5.9

• = Not recommended, consult factory.  
 1P = Single-pass heat exchanger.  
 2P = Two-pass heat exchanger.



**LAARS**   
**Heating Systems Company**  
 A subsidiary of **BRADFORD WHITE** Corporation

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](http://www.Laars.com) Litho in U.S.A. © Laars Heating Systems 0805 Document 1043R