MIGHTY THERM

Copper Finned
Gas Fired Hydronic Boiler

Powerful,

Efficient,

Reliable and

Economical

LAARS
HEATING SYSTEMS

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 warranty provides complete protection: one year on materials and workmanship for controls, combustion chamber, pump and tank (if 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.

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	115-1	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	*mm*	Outdoor inches	*mm*	Indoor inches	*mm*	Outdoor inches	*mm*	Indoor inches	*mm*	Outdoor inches	*mm*
Top	**37**	*940*	Unobstructed		**30**	*762*	Unobstructed		**24**	*610*	Unobstructed	
Connection Side	**12**	*305*	Unobstructed		**12**	*305*	**24**	*610*	**24**	*610*	**24**	*610*
Opposite Side	**6**	*152*	**6**	*152*	**6**	*152*	**24**	*610*	**24**	*610*	**24**	*610*
Front*	**18**	*457*	Unobstructed*		**24**	*610*	Unobstructed*		**24**	*610*	Unobstructed*	
Rear	**6**	*152*	**6**	*152*	**8**	*203*	**24**	*610*	**24**	*610*	**24**	*610*
Vent	**6	*152*	—		**6	*152*	—		**6	*152*	—	

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 (Teledyne 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" (1219mm) 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[1] MBTU/h	*kW*	Output[1] MBTU/h	*kW*	IBR Net Rating[1] MBTU/h	*kW*	Gas Connection[2] Size - inches NPT Natural[4]	LP[4]	Water Conn.[2] Size inches NPT	Dimensions[2,5] - inches (mm) A		B		C		V		Shipping Weight[3] lbs.	*kgs*
175	**175**	*51*	**142**	*42*	**123**	*36*	½-¾	½	1½	**18**	*457*	**27**	*686*	**23½**	*597*	**6**	*152*	**255**	*116*
250	**250**	*73*	**203**	*60*	**176**	*52*	¾	½	1½	**22½**	*572*	**31½**	*800*	**24¾**	*629*	**7**	*178*	**255**	*116*
325	**325**	*95*	**263**	*77*	**229**	*67*	¾	½	1½	**26¾**	*679*	**35¾**	*908*	**25⅞**	*657*	**8**	*203*	**325**	*148*
400	**400**	*117*	**324**	*95*	**282**	*83*	¾	½	1½	**31¾**	*806*	**40¾**	*1035*	**26⅞**	*683*	**9**	*229*	**360**	*163*
500	**500**	*147*	**405**	*119*	**325**	*95*	1	¾-1	2	**33⅝**	*854*	**45¼**	*1149*	**23⅝**	*600*	**10**	*254*	**612**	*278*
600	**600**	*176*	**486**	*143*	**423**	*124*	1	¾-1	2	**38⅝**	*981*	**50¼**	*1276*	**22⅝**	*575*	**12**	*305*	**702**	*319*
715	**715**	*210*	**579**	*170*	**504**	*148*	1	¾-1	2	**44¼**	*1124*	**55¾**	*1416*	**22⅝**	*575*	**12**	*305*	**750**	*340*
850	**850**	*249*	**689**	*202*	**599**	*176*	1-1¼	¾-1¼	2	**50⅝**	*1286*	**62¼**	*1581*	**21⅝**	*549*	**14**	*356*	**830**	*377*
1010	**1010**	*296*	**818**	*240*	**711**	*208*	1¼	1-1¼	2½	**58**	*1473*	**69½**	*1765*	**20⅝**	*524*	**16**	*406*	**945**	*429*
1200	**1200**	*352*	**972**	*285*	**845**	*248*	1¼	1-1¼	2½	**66¼**	*1683*	**77¾**	*1975*	**20⅝**	*524*	**16**	*406*	**995**	*451*
1430	**1430**	*419*	**1158**	*339*	**1007**	*295*	1¼	1¼	2½	**76**	*1930*	**87½**	*2223*	**19⅝**	*498*	**18**	*457*	**1080**	*490*
1670	**1670**	*489*	**1353**	*396*	**1176**	*345*	1¼-1½	1¼	2½	**85⅜**	*2169*	**97**	*2464*	**19⅝**	*498*	**18**	*457*	**1175**	*533*
1825	**1825**	*535*	**1478**	*433*	**1285**	*377*	1¼-1½	1¼	2½	**92¼**	*2340*	**103¾**	*2635*	**19⅝**	*498*	**18**	*457*	**1270**	*576*
2000	**2000**	*586*	**1639**	*480*	**1425**	*418*	1½	1¼-1½	4	**55½**	*1410*	**73**	*1854*	**24¼**	*616*	**22**	*559*	**1815**	*823*
2450	**2450**	*718*	**2009**	*589*	**1747**	*512*	1½-2	1½	4	**65½**	*1664*	**83**	*2108*	**24½**	*616*	**24**	*610*	**1950**	*885*
3050	**3050**	*894*	**2501**	*733*	**2175**	*637*	2	1½	4	**78**	*1981*	**95½**	*2426*	**24½**	*616*	**26**	*660*	**2100**	*953*
3500	**3500**	*1026*	**2870**	*841*	**2496**	*731*	2	1½	4	**88**	*2235*	**105½**	*2680*	**24½**	*622*	**28**	*711*	**2237**	*1016*
4050	**4050**	*1186*	**3321**	*973*	**2888**	*846*	2-2½	2	4	**100½**	*2553*	**118**	*2997*	**24½**	*616*	**30**	*762*	**2555**	*1160*
4500	**4500**	*1318*	**3690**	*1081*	**3209**	*940*	2½	2	4	**110½**	*2807*	**128**	*3251*	**24½**	*616*	**32**	*813*	**2750**	*1249*
5000	**5000**	*1465*	**4100**	*1201*	**3565**	*1045*	2½	2	4	**123**	*3124*	**140½**	*3569*	**24½**	*616*	**34**	*834*	**3050**	*1385*

Outdoor Models

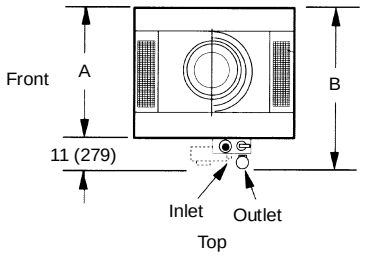
Outdoor Size	Input[1] MBTU/h	*kW*	Output[1] MBTU/h	*kW*	IBR Net Rating[1] MBTU/h	*kW*	Gas Connection[2] Size - inches NPT Natural[4]	LP[4]	Water Conn.[2] Size inches NPT	Dimensions[2] - inches (mm) A		B		C		V		Shipping Weight[3] lbs.	*kgs*
175	**175**	*51*	**137**	*40*	**119**	*35*	½-¾	½	1½	**18**	*457*	**27**	*686*	**14 1/16**	*357*	**6**	*152*	**255**	*116*
250	**250**	*73*	**195**	*57*	**170**	*50*	¾	½	1½	**22½**	*572*	**31¼**	*794*	**18⅝**	*473*	**7**	*178*	**285**	*129*
325	**325**	*95*	**254**	*74*	**220**	*65*	¾	½	1½	**26¾**	*679*	**35¾**	*908*	**19 3/16**	*487*	**8**	*203*	**325**	*148*
400	**400**	*117*	**312**	*91*	**271**	*79*	¾	½	1½	**31¾**	*806*	**40¾**	*1035*	**22⅝**	*575*	**9**	*229*	**360**	*163*
500	**500**	*147*	**410**	*120*	**357**	*105*	1	¾	2	**33¾**	*857*	**45¼**	*1149*	—		—		**751**	*341*
600	**600**	*176*	**492**	*144*	**428**	*125*	1	¾	2	**38¾**	*984*	**50¼**	*1276*	—		—		**821**	*373*
715	**715**	*210*	**586**	*172*	**510**	*149*	1	¾	2	**44¼**	*1124*	**55¾**	*1416*	—		—		**906**	*411*
850	**850**	*249*	**697**	*204*	**606**	*178*	1	¾	2	**50¾**	*1289*	**62¼**	*1581*	—		—		**1000**	*454*
1010	**1010**	*296*	**828**	*243*	**720**	*211*	1¼	1	2½	**58**	*1473*	**69½**	*1765*	—		—		**945**	*429*
1200	**1200**	*352*	**984**	*288*	**856**	*251*	1¼	1	2½	**66¼**	*1683*	**77¾**	*1975*	—		—		**1185**	*538*
1430	**1430**	*419*	**1173**	*344*	**1020**	*299*	1¼	1¼	2½	**76**	*1930*	**87½**	*2223*	—		—		**1330**	*604*
1670	**1670**	*489*	**1370**	*401*	**1191**	*349*	1½	1¼	2½	**85½**	*2172*	**97**	*2464*	—		—		**1490**	*676*
1825	**1825**	*535*	**1497**	*439*	**1302**	*382*	1½	1¼	2½	**92¼**	*2343*	**103¾**	*2635*	—		—		**1630**	*740*
2200	**2205**	*646*	**1786**	*523*	**1553**	*455*	1½-2	1½	4	**65½**	*1664*	**83**	*2108*	—		—		**2300**	*1044*
2800	**2745**	*804*	**2223**	*651*	**1933**	*566*	1½-2	1½	4	**78**	*1981*	**95½**	*2426*	—		—		**2670**	*1212*
3200	**3150**	*923*	**2552**	*748*	**2219**	*650*	2	1½	4	**88**	*2235*	**105½**	*2680*	—		—		**2750**	*1249*
3600	**3645**	*1068*	**2952**	*865*	**2567**	*752*	2-2½	2	4	**100½**	*2553*	**118**	*2997*	—		—		**3175**	*1441*
4000	**4050**	*1187*	**3281**	*961*	**2853**	*836*	2½	2	4	**110½**	*2807*	**128**	*3251*	—		—		**3380**	*1535*
4500	**4500**	*1319*	**3645**	*1068*	**3170**	*929*	2½	2	4	**123**	*3124*	**140½**	*3569*	—		—		**3790**	*1721*

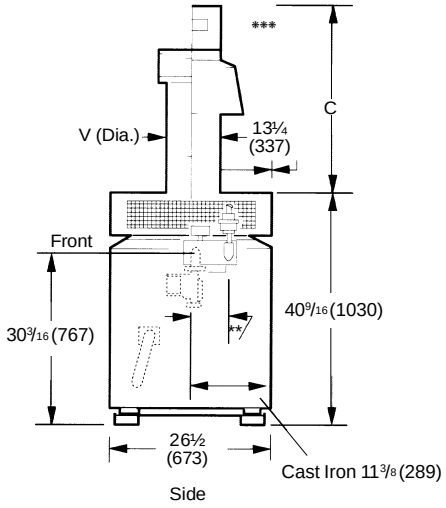
Notes:
1. Input and output must be derated 4% per 1000 feet above sea level when installed above 2000 feet altitude.
2. Dimensions are nominal.
3. Units with pumps: Add 20 lbs. (9 kg) to sizes 175-400 and 55 lbs. (25 kg) to sizes 500-1825.
4. When two gas connection sizes are shown, the smaller applies to the standard gas train, while the larger applies to optional trains. Consult factory for exact specifications.
5. 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

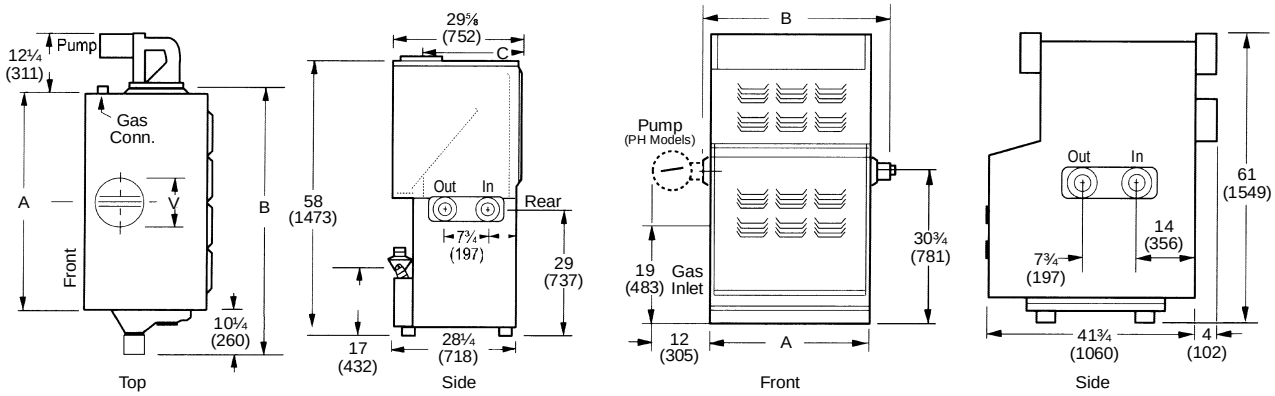




** Cast Iron 5¼, Bronze 2¾

*** Vent damper required only for U.S. indoor installations of sizes 175-250

Sizes 500-1825

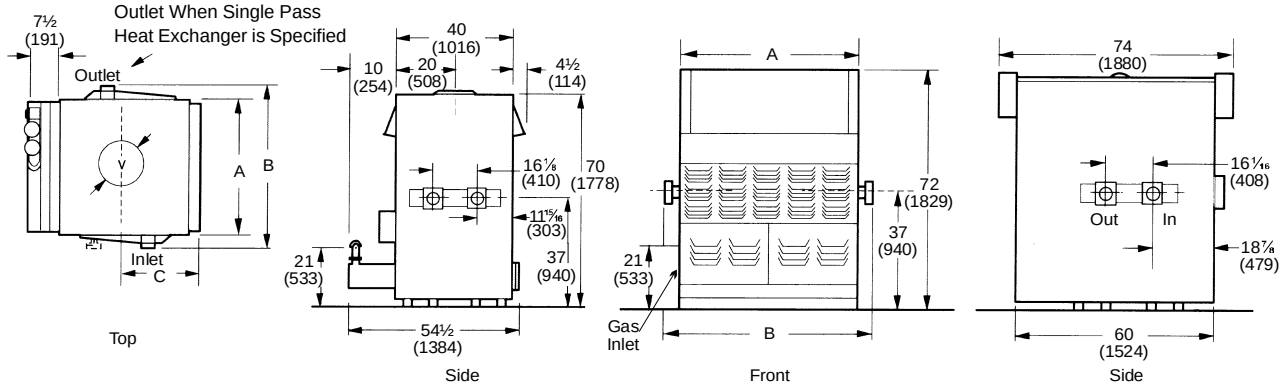


Indoor

Outdoor

Sizes 2000-5000

Sizes 2200-4500



Indoor

Outdoor

Dimensions shown are inches (mm).

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:

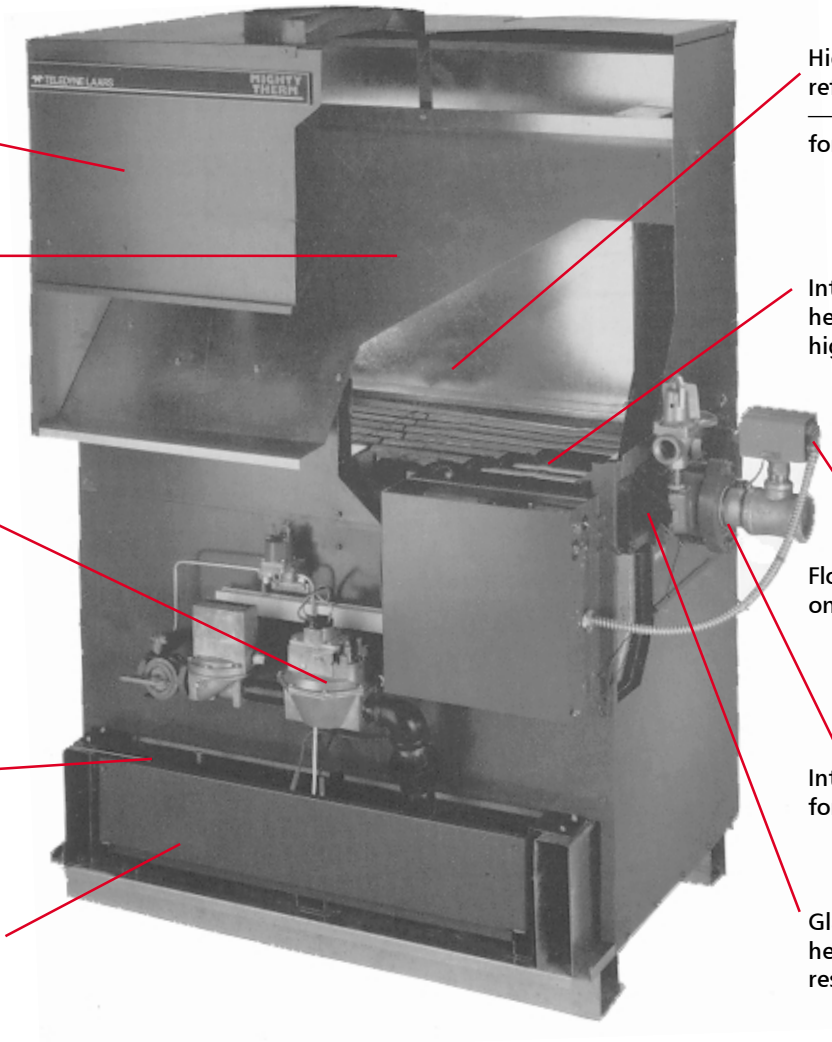
- Additional manual shutoff.
- Additional safety valve.
- Motorized safety valve (available with proof of closure).
- High/low gas pressure switches.
- Normally open vent valve.
- Leak test valve.

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.
- EM² — 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

Waterpik Technologies, Inc.
6000 Condor Drive, Moorpark, CA 93021 • 805.529.2000 • FAX 805.529.5934
20 Industrial Way, Rochester, NH 03867 • 603.335.6300 • FAX 603.335.3355
480 S. Service Road West, Oakville, Ontario, Canada L6K 2H4 • 905.844.8233 • FAX 905.844.2635
www.laars.com