

LATTNER

LW Cabinet Style Electric Hot Water Boilers



- Fully Modulating Stepped Contactors & Heating Element Sequence Controller
- Incoloy Superalloy Heating Elements

LW-Cabinet Style

- 180 to 2000 KW- Horizontal
- 614 to 6826 MBH
- Section IV ASME up to 160 psi and 250° F



Safe • Sure • Simple

Applications

LATTNER LW-LH Electric Hot Water Boilers provide economical hot water supply for space heating in commercial, industrial, and institutional buildings. Also used to supply hot water for industrial process applications .

Standard Features

VESSEL CONSTRUCTION - all welded steel low pressure vessel built in accordance with ASME Section IV and registered with the National Board with a minimum design pressure of 125 psi standard; to 160 psi optional. Data reports furnished. Horizontal construction standard; vertical construction also available

ENCLOSURE - heavy gauge control panel and vessel enclosure mounted on a 4" channel base. All surfaces protected against corrosion with heat resistant silicon acrylic enamel. Removable lifting lug(s) and 2-point key-locking doors standard.

INSULATION - minimum 4" fiberglass on all sides of vessel.

RELIEF VALVE -ASME rated pressure relief valve furnished with every boiler.

HIGH LIMIT CUTOUT - manual reset high temperature thermal cutout de-energizes boiler in event of an over temperature condition.

DRAIN/SLOWDOWN VALVE - brass bodied, full opening valve sized to Code requirements provides for vessel draining, cleaning and maintenance procedures.

GAUGES - indicating temperature and pressure gauges with 3 1/2" dials are mounted on side panel of control cabinet for easy visibility

WARRANTY- 1 Year Standard, 5 Year Optional at added cost.

INCOLAY TUBE BUNDLE- 1700° F, Anti Scaling.

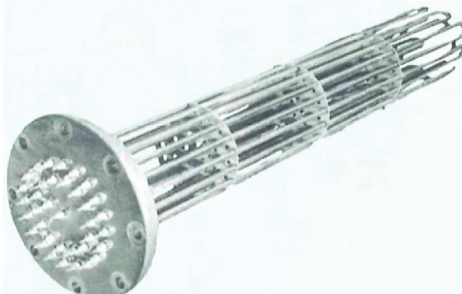


Figure 1

CONTROLS - all boilers may be operated to 240F. Boilers with 4 or more steps are provided with linear step controller and recycling feature with temperature sensor. Boilers with one to three steps have heavy duty multistage aquastats to provide close temperature control. All boilers are provided with disconnecting break magnetic contactors, current limiting fuses with 200,000 ampere interrupting capacity (may be mounted on copper bus bar when large numbers of steps are provided), 120V control transformer with fused primary and secondary, one pilot light each step, control circuit and safety circuit monitor lights.

MAIN SUPPLY TERMINALS - furnished on all boilers for up to 500 MCM copper or aluminum conductors to accept a single electrical service. Above 500 MCM, multiple supplies will be used. Knockouts for supply conductors are located at top of control panel as standard. Specify bottom or side location if required. See Rating Tables, Pages 6 and 7 for detailed supply conductor sizing.

ELEMENT BUNDLE -Single U-bend Incoloy heating elements are spaced a full 5/8" apart for maximum water circulation and heat transfer. Six inch cold pins and extra wide spacing add protection from hot spots under adverse water conditions when deposits build up over a period of time. Incoloy will withstand scaling and temperatures to approximately 1700° F.

UL LISTED - UL LISTING - under File No. E30432 up to 600V and 3600KW. For larger requirements, two or more boilers can be ganged together.

CONTROLS- All basic controls and terminals are located in an integral ventilated control cabinet, factory wired and functionally tested. Controls include fuses with 200,000 ampere interrupting capacity, magnetic contactors UL listed for 100,000 cycles, 120 volt control transformer with primary and secondary fuses, step controller which recycles to zero on power failure, pilot light for each heating step, control circuit toggle switch. Note: On units with 4 steps or less, a multistage thermostat may be supplied instead of step controller.

MODULATING SEQUENCE CONTROLLER- Controller consists of an electronic step controller which receives water temperature indication from a sensor mounted in the vessel. Each step controls one or more contactors to energize heating elements. The controller will turn on the elements gradually at preset intervals to prevent power surges. Progressive sequencer option provides first on/first off control for extended life of contactors and heating elements.

To prevent a power surge after power interruption, the controller will reset automatically to the "OFF" position when power is restored. Normal sequencing then stages the heating elements in accordance with thermostat requirements.



Ratings — 600V, 480V, 240V 3 PHASE ***

TABLE 3: RATINGS AND WIRING INFORMATION

KW	MODELS AND RATINGS		600V 3 PHASE			480V 3 PHASE		240V 3 PHASE	
	No. of Steps**	Model No.	MBH	Amps	*Total No. & Size of Conductors	Amps	*Total No. & Size of Conductors	Amps	Total No. & Size of Conductors
15									
30									
45									
60									
75									
90									
120									
150									
180	6	180-	614	173	3 - #4/0	216	3 - 300	433	6 - 300
210	7	210-	717	202	3 - 250	253	3 - 400	505	6 - 400
240	8	240-	819	231	3 - 350	289	3 - 500	577	6 - 500
270	8	270-	922	260	3 - 400	325	6 - #3/0	650	9 - 300
300	8	300-	1024	289	3 - 500	361	6 - #4/0	722	9 - 350
330	8	330-	1126	318	6 - #3/0	397	6 - 250	794	9 - 400
360	10	360-	1229	346	6 - #4/0	433	6 - 300	866	9 - 500
390	10	390-	1331	375	6 - 250	469	6 - 350	938	12 - 350
420	10	420-	1433	404	6 - 250	506	6 - 400	1010	12 - 400
450	10	450-	1536	433	6 - 300	541	6 - 500	1083	12 - 500
480	10	480-	1638	462	6 - 350	577	6 - 500	1155	12 - 500
510	10	510-	1741	491	6 - 350	613	9 - 300	1227	15 - 400
540	10	540-	1843	520	6 - 400	650	9 - 300	1299	15 - 400
570	10	570-	1945	548	6 - 500	686	9 - 300	1371	15 - 500
600	10	600-	2048	577	6 - 500	722	9 - 350	1443	15 - 500
630	10	630-	2150	606	6 - 500	758	9 - 400	1516	15 - 500
660	10	660-	2253	635	9 - 300	794	9 - 400	1588	18 - 400
690	10	690-	2355	664	9 - 300	830	9 - 500	1660	18 - 500
720	10	720-	2457	693	9 - 350	866	9 - 500	1732	18 - 500
750	10	750-	2560	722	9 - 350	902	9 - 500	1804	18 - 500
780	10	780-	2662	751	9 - 400	938	12 - 350	1876	21 - 400
810	10	810-	2765	779	9 - 400	976	12 - 350	1949	21 - 500
840	10	840-	2867	808	9 - 500	1010	12 - 400	2021	21 - 500
870	10	870-	2969	837	9 - 500	1046	12 - 400	2093	21 - 500
900	10	900-	3072	866	9 - 500	1083	12 - 500	2165	24 - 500
930	15	930-	3174	895	9 - 500	1119	12 - 500	2237	24 - 500
960	15	960-	3276	924	12 - 350	1155	12 - 500	2309	24 - 500
990	15	990-	3379	953	12 - 350	1191	12 - 500	2382	24 - 500
1020	15	1020-	3481	981	12 - 350	1227	15 - 400	2454	30 - 350
1050	15	1050-	3584	1010	12 - 400	1263	15 - 400	2525	30 - 400
1080	15	1080-	3686	1039	12 - 400	1299	15 - 400	2598	30 - 400
1120	15	1120-	3822	1077	12 - 400	1347	15 - 500	2694	30 - 500
1160	15	1160-	3959	1116	12 - 500	1395	15 - 500	2790	30 - 500
1200	15	1200-	4096	1155	12 - 500	1443	15 - 500	2887	30 - 500
1240	20	1240-	4232	1193	12 - 500	1492	15 - 500	2983	30 - 500
1280	20	1280-	4369	1232	15 - 350	1540	18 - 400		
1320	20	1320-	4505	1270	15 - 400	1588	18 - 400		
1360	20	1360-	4642	1309	15 - 400	1636	18 - 500		
1400	20	1400-	4778	1347	15 - 500	1684	18 - 500		
1440	20	1440-	4915	1386	15 - 500	1732	18 - 500		
1480	20	1480-	5017	1424	15 - 500	1780	18 - 500		
1520	20	1520-	5188	1462	15 - 500	1828	21 - 400		
1560	20	1560-	5324	1501	15 - 500	1876	21 - 400		
1600	20	1600-	5460	1540	18 - 400	1924	21 - 500		
1640	20	1640-	5597	1578	18 - 400	1973	21 - 500		
1680	20	1680-	5734	1616	18 - 500	2021	21 - 500		
1720	20	1720-	5870	1655	18 - 500	2069	21 - 500		
1760	20	1760-	6007	1693	18 - 500	2117	21 - 500		
1800	20	1800-	6143	1732	18 - 500	2165	24 - 500		
1840	20	1840-	6280	1770	18 - 500	2213	24 - 500		
1880	20	1180-	6416	1809	18 - 500	2261	24 - 500		
1920	20	1920-	6553	1847	24 - 350	2309	24 - 500		
1960	20	1960-	6689	1886	24 - 350	2357	24 - 500		
2000	20	2000-	6826	1924	24 - 350	2405	24 - 500		
2040	20	2040-	6963	1963	24 - 350	2454	30 - 350		
2080	20	2080-	7099	2001	24 - 400	2502	30 - 400		
2160	20	2160-	7372	2078	24 - 400	2598	30 - 400		
2240	20	2240-	7645	2155	24 - 500	2694	30 - 500		
2320	20	2320-	7918	2232	24 - 500	2790	30 - 500		
2400	20	2400-	8191	2309	24 - 500	2887	30 - 500		
2480	20	2480-	8464	2386	24 - 500	2983	30 - 500		
2560	20	2560-	8737	2463	30 - 350	3079	36 - 400		
2640	20	2640-	9010	2540	30 - 350	3175	36 - 400		
2720	20	2720-	9283	2617	30 - 400	3272	36 - 500		
2800	20	2800-	9556	2694	30 - 500	3368	36 - 500		
2880	20	2880-	9829	2771	30 - 500	3464	36 - 500		
2960	20	2960-	10,102	2848	30 - 500	3560	36 - 500		
3040-3600	20	Consult factory							

See Space Saver Bulletin #SB-115

*Conductor sizes based on 125% ampacity for continuous duty per NEC with three 75C copper wires in a conduit.
 Disconnect option may permit larger wire ** Subject to change, depending on step-controller stages and amps per stage.
 ***For other voltages, consult factory.



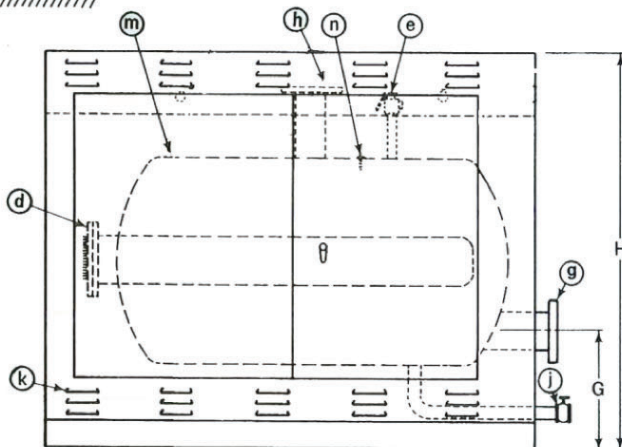
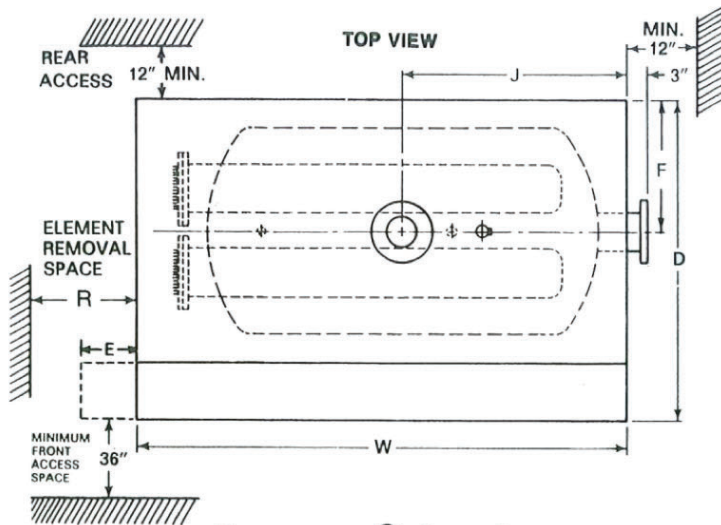
DIMENSIONS, WEIGHTS AND CAPACITIES (FOR 480/600 VOLT, HORIZONTAL CONSTRUCTION ONLY*)

KW Range	Overall size (inches)			Piping Size (inches)			Piping location (inches)			Shipping Weight (pounds)	Approx. Operating Weight (pounds)	Approx. Water Capacity (gallons)	Vessel Diameter (Inches)		
	W	H	D	E	K	R	Return	Drain	F					G	J
7.5-150	(SEE SPACE SAVER)														
180-240	70	40	32	0	10	44	2 1/2 TH		12	14 3/4	29 3/4	1100	1475	45	16
241-360	70	40	36	0	6	44	3 TH		14	15	31 1/4	1800	2400	73	20
361-480	70	47	46	0	0	44	3 TH	1 1/4	19	15	32	2200	3450	150	30
481-720	70	72	48	0	28	44	4 TH	1 1/4	19	15	32	2500	3750	150	30
721-1080	70	76	54	0	22	44	6 FL	1 1/2	22	20	32	2650	4450	215	36
841-1320	70	80	62	0	22	44	6 FL	1 1/2	25	19 1/2	33	3350	5760	290	42
960-1440	96	80	56	0	22	64	6 FL	1 1/2	22	20	44	3650	6320	320	36
1160-1600	96	80	62	12	22	64	6 FL	1 1/2	25	19 1/2	44	4700	8300	435	42
†1480-1920	96	86	68	24	22	64	8 FL	1 1/2	28	20	45	5400	9550	500	48
†1960-2400	96	86	68	24	22	64	8 FL	1 1/2	28	20	45	7550	11700	500	48
†2240-2880	96	86	74	36	16	64	8 FL	1 1/2	31	20	45	8650	13670	605	54
†2960-3360	96	86	86	0	16	64	8 FL	2	31	20	45	9600	14620	605	54
†3440-3600Δ	96	86	92	0	22	44	8 FL	2	46	25	39	1100	17390	770	60

†Control panels both sides (front and back or side by side). Allow 36" for NEC clearance.

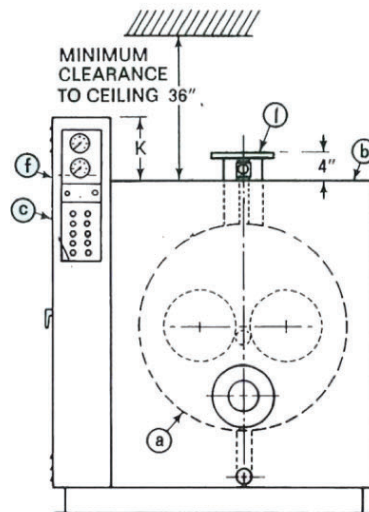
*Dimensions based on standard horizontal 480/600 volt construction and may vary for vertical units, other voltages or units with optional features; accurate dimensions provided on certified prints. For vertical units or other voltage consult factory.

CONSTRUCTION

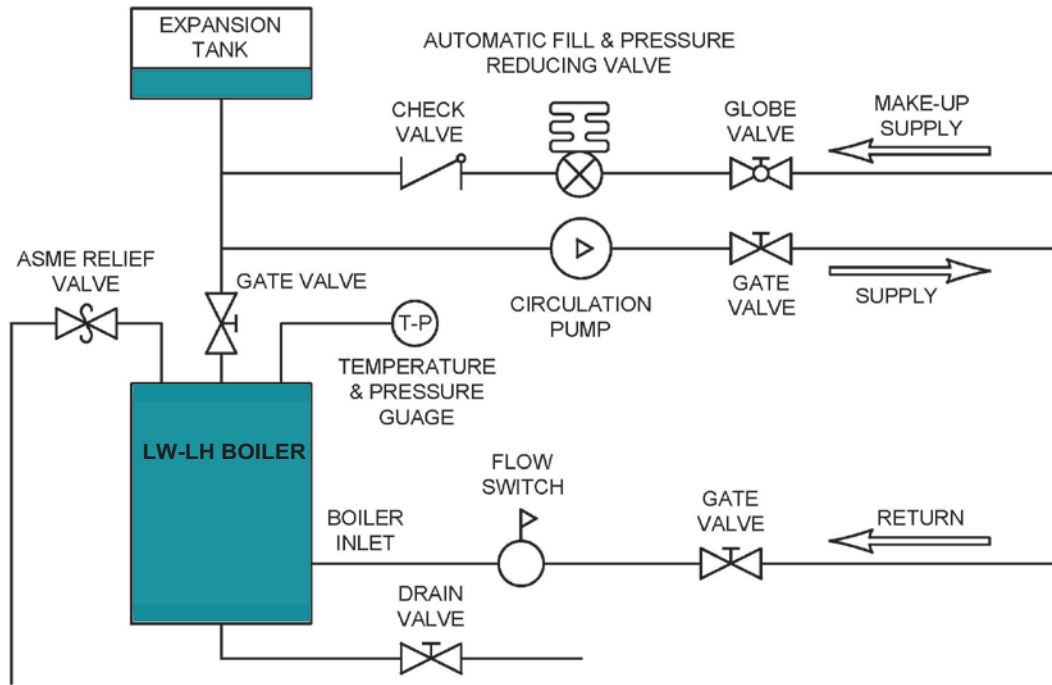


STANDARD FEATURES

- (a) BOILER VESSEL ("H" STAMP)
- (b) BOILER ENCLOSURE
- (c) CONTROL PANEL
- (d) REMOVABLE ELEMENTS
- (e) ASME RATED PRESSURE RELIEF VALVE
- (f) PRESSURE AND TEMPERATURE GAUGES
- (g) INLET
- (h) OUTLET
- (i) DRAIN/BLOWDOWN VALVE
- (k) VENTILATION LOUVERS
- (l) LIFTING LUG-REMOVABLE
- (m) LOW WATER PROBE
- (n) HIGH TEMPERATURE LIMIT



Typical Boiler Piping Diagram



Technical Data

TABLE 1: KW RATING REQUIRED

°F Rise	LB HR									
	5,000	10,000	15,000	20,000	25,000	30,000	35,000	40,000	45,000	50,000
	G. P. H.									
	600	1,200	1,800	2,400	3,000	3,600	4,200	4,800	5,400	6,000
°F Rise	G. P. M.									
	10	20	30	40	50	60	70	80	90	100
5	7.3	14.6	22.0	29.3	36.3	43.9	51.2	58.5	65.9	73.2
10	14.7	29.3	43.9	58.5	73.2	87.8	102	117	132	146
20	29.4	58.5	87.8	117	146	176	205	234	263	293
30	43.9	87.8	132	176	220	263	307	351	395	439
40	58.6	117	176	234	293	351	410	468	527	585
50	73.2	146	220	293	366	439	512	585	659	732
60	87.8	176	263	351	439	527	615	702	790	878
70	102	205	307	410	512	615	717	820	922	1024
80	117	234	351	468	585	702	820	937	1054	1171
90	132	263	395	527	659	790	922	1054	1185	1317
100	146	293	439	585	732	878	1024	1171	1317	1463
110	161	322	483	644	805	966	1127	1288	1449	1610
120	176	351	527	702	878	1054	1229	1405	1580	1756
130	190	380	571	761	951	1141	1332	1522	1712	1902
140	205	410	615	820	1024	1229	1434	1639	1844	2049
150	220	439	659	878	1098	1317	1537	1756	1976	2195
160	234	468	702	937	1171	1405	1639	1873	2107	2341
170	249	498	746	995	1244	1493	1741	1990	2239	2488

$KW = GPM \times \Delta T (^{\circ}F) \times .146$
 $KW = GPH \times \Delta T (^{\circ}F) / 410$
 $\Delta T (^{\circ}F) = KW / (GPM \times .146)$
 $KW = (BTU/HR) / 3413$
 $KW = MBH / 3.413$

1 Kilowatt Hour will raise:
 4.100 gallons of water 100F
 4.555 gallons of water 90F
 5.125 gallons of water 80F
 5.857 gallons of water 70F
 6.833 gallons of water 60F
 8.200 gallons of water 50F
 10.250 gallons of water 40F

$BHP = 33,479 \text{ BTU/HR}$
 $BHP = 9,809 \text{ kilowatts}$

1 gallon of water =
 8.336 lbs. @ 62°F.
 1 cu. ft. of water =
 62.348 lbs. @ 62°F

$^{\circ}F = (1.8 \times ^{\circ}C) + 32$
 $^{\circ}C = .55 (^{\circ}F - 32)$

3 phase amps =
 watts / (volts x 1.73)

1 phase amps = watts/volts

Optional Built-In Features

PROGRESSIVE SEQUENCE CONTROLLER • solid state, first on-first off progressive sequencing controller equalizes contactor wear and element life by rotating the order in which they are energized. All circuits are dropped on power failure and recycled to starting position when power is restored. Progressive sequencing stages the heating elements in accordance with load requirements.

DISCONNECT SWITCH -nonfused, interlocked with control panel door to prevent access unless power is disconnected. Available for boilers rated to 4000 amps. Boilers rated more than 100 amps are available with shunt trip mechanism to deenergize boiler in event of a low water or high pressure condition or to disconnect boiler from its power source from a remote location by means of an auxiliary pilot switch (by others).

DOOR INTERLOCK SWITCH -used with remote shunt trip disconnect switch (above) or circuit breaker. Switch may be defeatable for use by authorized service personnel and automatically resets when doors are closed.

TOGGLE SWITCHES -wired in control circuit to deenergize heating circuits individually or for other function, as specified.

MONITORING TERMINALS • for connection of remote readout devices such as building control centers and annunciator systems.

NONSTANDARD INLET OR OUTLET PIPES -allows direct mating to existing pipe lines. Specify size required.

OUTDOOR AIR RESET -adjustable reset ratio of 112:1 to 10:1 resets boiler water temperature from .5°F. or 10°F. for each degree of outdoor temperature change. Includes additional outdoor air sensor for field mounting and wiring to terminals provided in boiler.

AIR SEPARATOR -Air vent fitting and dip tube outlet on vessel allows for piping of trapped air to remote expansion tank supplied by others. Improves circulation and decreases air noise.

HIGH LIMIT CUTOUT • automatic reset; provided in addition to the standard manual reset. When used as an auxiliary limit, it is set to cut out before the manual reset high limit on high temperature.

LOW WATER CUTOFF -auxiliary probe or float type (Auto reset) set at higher level than standard manual reset probe type.

Optional Features and Accessories

KWH DEMAND LIMITER • reduces electrical utility demand charges by deferring portions of boiler load according to total building demand requirements. Includes current transformer, electronic digital display of KWH and load control relay for programming demand limit.

KW LOAD LIMITER • locks out preset percentages of boiler heating stages to reduce electrical energy charges by limiting KW on warmer days.

AMMETER -flush mounted on boiler panel. Includes current transformer and momentary switch. Monitoring of three phases is optional.

VOLTMETER -flush mounted on boiler panel for indication of line voltage.

KILOWATT HOUR METER -mounted with current transformer to give digital indication of KWH.

PROGRAM CLOCK • 7 day control provided for automatic starting and/or operation of boiler at preset intervals. Operation on selected days may be omitted, if desired.

FLOW SWITCH • installed in water return line to deenergize boiler if water flow stops.

ALARM HORN & PILOT LIGHT -provides audio-visual indication of high temperature or low water condition-with silencing switch.

GROUND FAULT PROTECTION SYSTEM -minimizes damage from a ground fault condition. Meets requirements of the NEC Article 230-95 which states ground fault protection is required for equipment rated 1 000 amps or more if fed from a wye connected, grounded neutral service measuring more than 150 volts to ground. Also used with boilers fed from a three wire service or rated less than 1000 amps. System is factory wired in control panel and connected to boiler supply wires. Consists of current transformer which senses current imbalance in supply conductors, ground fault relay adjustable between 200 and 1200 fault amps and a non-fused disconnect switch with shunt trip mechanism. Disconnect switch is provided in boiler as standard but can also be mounted in a remote enclosure if specified. Suitable for systems with up to 125,000 amps available fault current.



Sample Specifications

1. Contractor to furnish and install UL Listed, Lattner electric boiler(s) with capacities and voltages as scheduled, equipped with incoloy sheathed elements mounted on standard ASA flanges.
2. Pressure vessel to be horizontally constructed per ASME Standards with "H", or "M" stamp registered with National Board of Boiler and Pressure Vessel Inspectors.
3. Heating elements shall be 15 KW maximum each, 75 Watts per square inch, single U-bend construction and shall be individually removable from flange. Furnish a 6 inch cold pin in each element terminal and allow 5/8" minimum clearance between elements. Subdivide load branch circuits into 48 amps maximum each. Elements to be wired with UL Listed 200C conductors.
4. All controls to be prewired and tested in integral ventilated control cabinet. Boilers will, 1 or 2 steps shall be provided with heavy duty adjustable aquastats. Boilers rated 3 steps or more shall have step controller and recycling relay to return the controller to off position after power failure.
5. Furnish fuses for each heating element with 200,000 ampere Interrupting capacity. Boilers with multiple steps may have fuses mounted on copper bus in spring reinforced clips. Provide disconnecting break contactors, 120V control transformer with fused primary and secondary, pilot lights for each heating step, control circuit switch, supply voltage indicator and properly sized lugs for incoming conductors. Knockouts to be provided in top of control cabinet above line terminal lugs by others.
6. Boiler(s) to be complete with ASME rated pressure relief valve, probe-type low water cutoff, temperature and pressure gauges flush-mounted in control cabinet face, manual reset high temperature cutout and drain valve Board. Data reports are to be provided. Vessel to be insulated for minimum heat loss with a 4" fiberglass blanket rated at 1 pound per cubic foot de
7. Pressure vessel to be insulated on all sides with 4" fiberglass blanket. Lifting lug(s) optional . Pressure vessel to be mounted on a 4" steel channel base with steel vessel enclosure and heavy ventilated NEMA 1 control cabinet. Provide hinged door with two-point, key-locking handle. All surfaces to be protected against corrosion with heat resistant silicon acrylic enamel.

Manufacturer's Warranty

A Lattner boiler shell is guaranteed to be constructed in accordance with the ASME Code. A boiler inspector, not in our employ, certified by the National Board of Boiler and Pressure Vessel Inspectors, supervises the construction, gives final hydrostatic test, and places stamp of approval on the completed shell.

Boiler accessories are guaranteed for 1 year standard (optional 5 Year Limited Vessel available at extra cost) from date of shipment against defective workmanship and material and such items will be replaced FOB factory. Liability for damages caused by such defective parts is limited to such replacements and in no event shall we be liable for indirect or consequential damages.



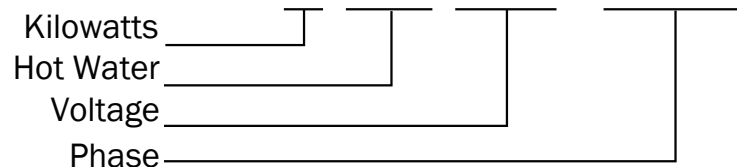
Safe • Sure • Simple

HOW TO ORDER

- Model Number
- KW
- Volts / Phase
- Operating Temperature
- Maximum Operating Pressure
- GPM
- BTU
- Inlet and Outlet size (if not using Lattner standard)
- Optional Features

Model Designation

300 LW - 575- 3



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