



HEATER HANDBOOK

WATER HEATED ON DEMAND



Leslie Controls



CIRCOR | Leslie Controls

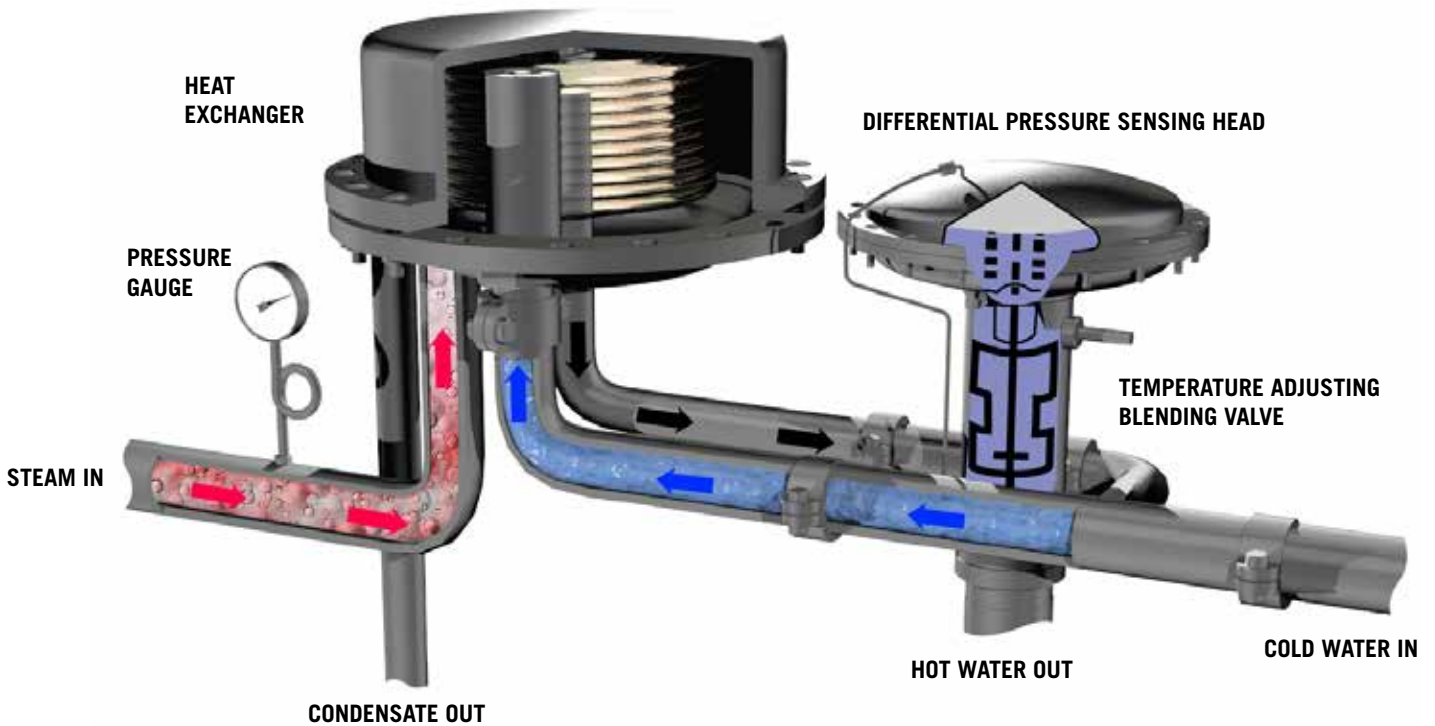
HEATER HANDBOOK

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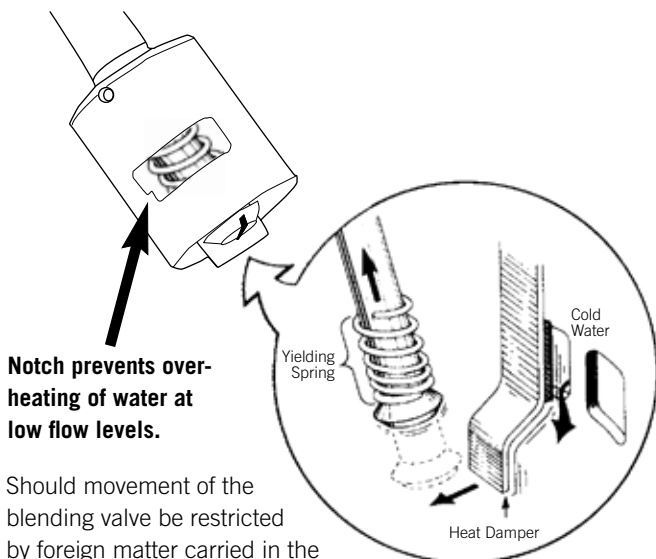
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CONSTANTEMP COMPACT PRE-PIPED DESIGN AND FEEDFORWARD OPERATION

OFTEN IMITATED, BUT NEVER MATCHED



TWO INNOVATIONS TO ENSURE SAFETY



Notch prevents over-heating of water at low flow levels.

Should movement of the blending valve be restricted by foreign matter carried in the water, a yielding spring arrangement allows the diaphragm and stem to move up, uncovering a heat damper in the characterized blending valve. This damper allows cold water to enter the blended mix, eliminating the possibility of over-heating or scalding.

WARRANTY

The heat exchanger shall carry an extended warranty in addition to the manufacturers warranty as follows:

COILS - The heat exchanger coils shall carry an unconditional, non-prorated 10 year guarantee against failure due to manufacturing defects.

PRESSURE VESSEL - The heat exchanger pressure vessel shall carry an unconditional, non-prorated 10 year guarantee against any failure.

All other parts of the package, such as blending valve, gauges and traps, etc. have the standard LESLIE warranty.

CONSTANTEMP OPERATION

FLOW DEMAND

The central component of the Constantemp steam-water heater is the feed forward blending valve that is activated by a differential pressure sensing head.

An impulse line to the top of the blender's differential sensing head comes from a connection to the cold water supply line. Blended water is sensed under the diaphragm through ports in the blending valve.

The proportioning action of the blending valve occurs as changes in the sensed pressure differential across the diaphragm are created by flow demand.

As demand for blended hot water increases, a drop in blended water pressure is sensed under the diaphragm. This pressure drop causes the stem in the blending valves to move downward, lining up the hot and cold water ports of the valve plug with the ports in the body of the blending valve.

This action automatically proportions the hot and cold water blend ratio to maintain the set temperature for all flow demands. Water is blended instantly and automatically, with virtually no lag in response to demand.

The blending valve plug (a piston or slider-type valve) moves down to open and is rotated during its

travel to perform the proportional blending of hot and cold water to the desired temperature. The rotation rate during the valve movement is set by the demand on the system.

Should movement of the blending valve be restricted by foreign matter carried by the water flow, a yielding spring arrangement allows the diaphragm and stem to move up, uncovering a "heat damper" in the characterized blending valve. This damper will allow more cold water to enter the blended mix, reducing the possibility of overheating or scalding.

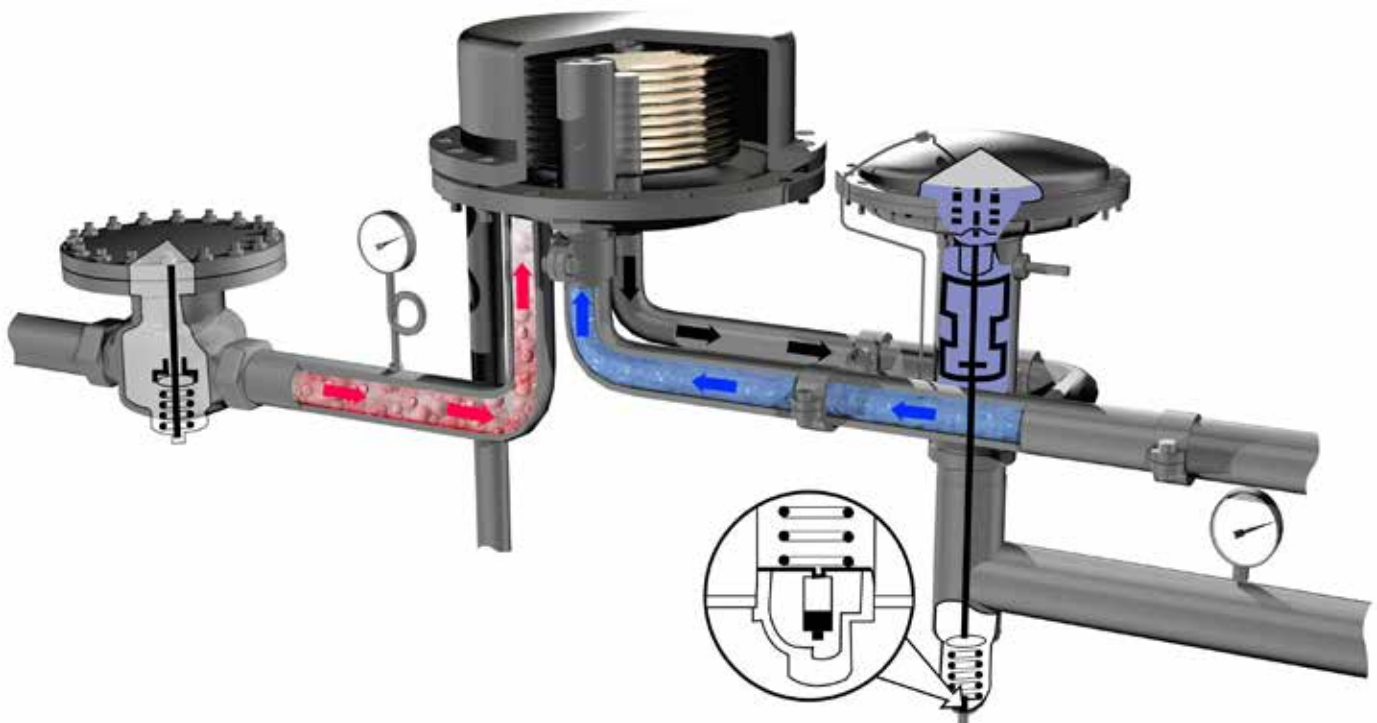
Temperature settings are easily made by using the adjusting rod located on the stem of the blending valve. A simple movement of the rod in one direction or the other allows outlet water temperature to be preset.

PRE-PIPED SYSTEM

The Constantemp steam-water package is a completely pre-piped system with properly sized accessories supplied as part of the package.

Models operating with steam pressures above 15 psig are supplied with steam pressure reducing valve. All features are supplied with traps, strainers, steam pressure gauge and thermometer.

Variable steam pressure constantemp – for greater flows at maximum temperature rises.



CONSTANTEMP HEATER

APPLICATION DATA

- › Hospital Patient & Domestic Hot Water
- › University Dormitories
- › Safety Shower Systems
- › Industrial Shower Rooms
- › Booster Heater
- › Building Heat

FEATURES

- › Single or Double Wall Exchanger
- › Accuracy $\pm 3^{\circ}\text{F}$
- › Feed-Forward Control
- › Flows up to 120 GPM
- › Adjustable Temperature 105-180°F
- › No Storage Tank Required
- › Built In Safety
- › Heats Water Only on Demand
- › Fits Through Standard Doorways
- › High Turndown

OPTIONS

- › Skidded
- › Recirculation Kit
- › Insulated Cover
- › Pressure Gradient Monitor

MODELS

- L** Single Wall
- LDW** Double Wall

RATINGS

Adjustable temperature range	45-120 GPM: 105-180°F (41-82°C) 15 and 30 GPM: 105-150°F (41-65°C)
Steam pressure	2-250 PSIG (14-1725 kPa) over 15 (104 kPa), requires steam reducing valve
Water pressure	150 PSI max. (1034 kPa) Option: 250 PSI max. (1723 kPa) (single wall only)
Flow ranges	Single Wall: 15, 30, 45, 60, 75, 90, 105, 120 GPM (57, 114, 170, 227, 284, 341, 397, 454 L/min) Double Wall: 30, 60, 90, 120 GPM (114, 227, 341, 454 L/min)



SIZING INFORMATION
GENERAL PAGE 27
CONSTANTEMP PAGE 31

CONSTANTEMP HEATER

SPECIFICATIONS

Leslie Constantemp _____ * low pressure steam water heater, for use on 2-15** psig steam consisting of an integrally piped (single wall) (double wall) heat exchanger, mounted on a heavy-duty angle iron frame. Heater control package shall be capable of supplying _____ GPM of hot water when heated from _____ °F to _____ °F without the use of thermostatic control devices or storage tanks. Heater shall be capable of maintaining $\pm 3^{\circ}\text{F}$ over a flow range of a few percent to 100%. The water shall flow through the tubes and steam in the shell. If recirculation is required, the heater shall be equipped with a recirculation system with a non-adjustable valve to set the recirculation temperature. The recirculation system shall be integrally mounted and shall not alter the overall dimensions of the heater. The overall dimensions shall not exceed _____.*** The unit shall provide connections in the manifolds to measure pressures and temperatures.

* Insert model number from chart.

** For higher steam pressure use a pressure regulator to reduce pressure to 15 psi.

*** Insert dimensions from chart.

MATERIALS OF CONSTRUCTION

Exchanger

Ductile Iron (single wall only) (75psi) (517 kPa)

Cast Steel (150 psi) (1034 kPa)

Coils

Standard: Copper

Optional - Single Wall: Admiralty, Cupro-nickel, Stainless Steel (ASME SEC. VIII div. 1)

Blending Valve

Body: Bronze

Plug: Hastelloy

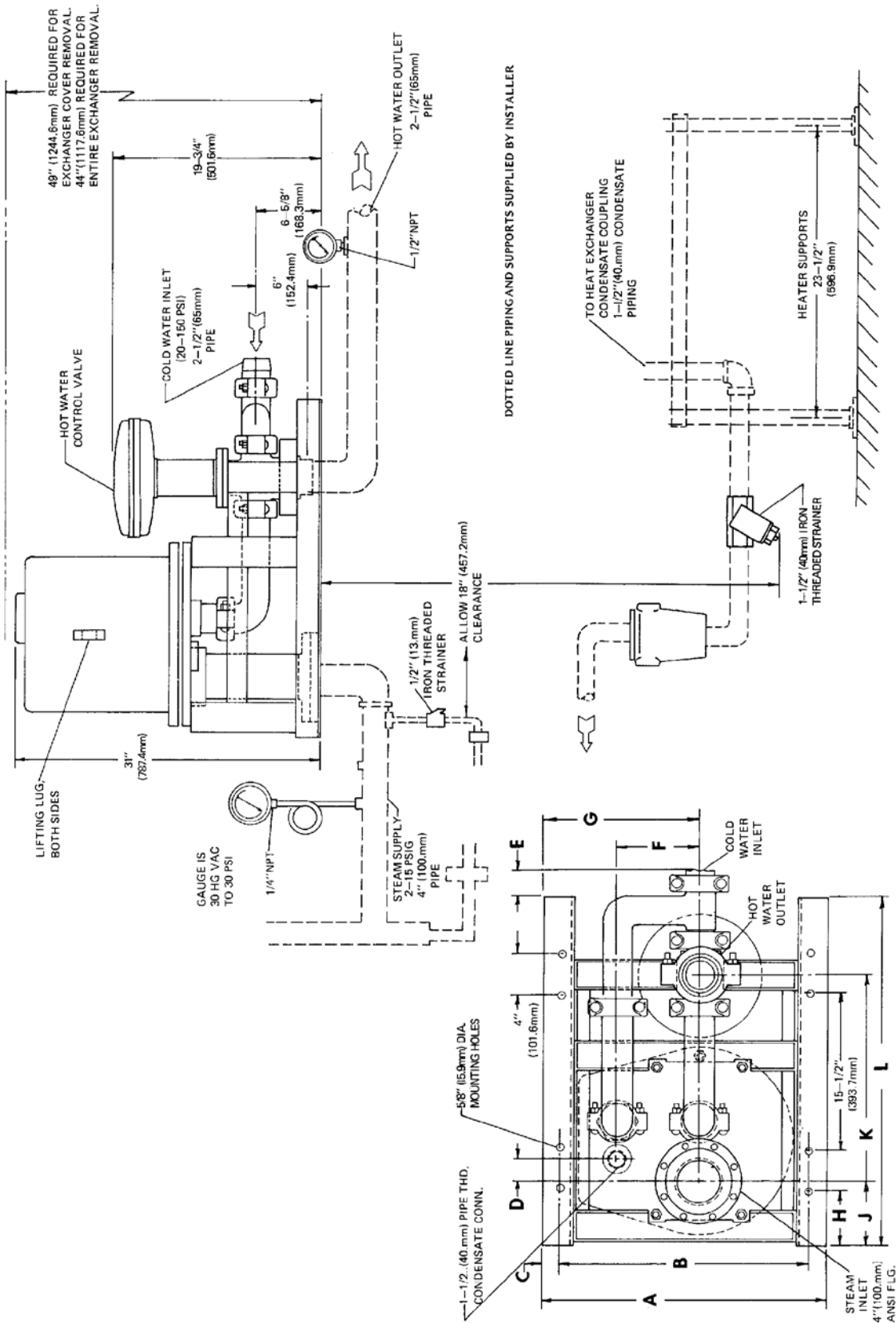
Safe water drinking act compliant; NSF 61 and NSF/ANSI 61

Piping Connections inches (mm)

MODEL	CW INLET	HW OUTLET	STEAM IN	CONDENSATE OUT
E1500L & E300L	1½ (38)	2 (50)	3 (76)	1¼ (32)
E340LDW	1½ (38)	2 (50)	3 (76)	1½ (38)
E4500L & E600L	2	2 (50)	3	1½
E640LDW	1 (38)	2 (50)	3 (102)	1½ (38)
E7500L' & E900L'† E10500L' & E1200L'†	2½ (64)	2½ (64)	4 (102)	1½ (38)
E940LDW & F1240LDW	2½ (64)	2½ (64)	4 (102)	2 (50)

† Steam inlet is flanged.

CONSTANTEMP HEATER, MODELS E-4500L, E-600L, E-900L, E-10500L, AND E-1200L



CONSTANTEMP HEATER, MODELS E4500L, E-600L, E900L, E10500L, and E1200L

DIMENSIONS inches (mm) AND WEIGHTS pounds (kg)

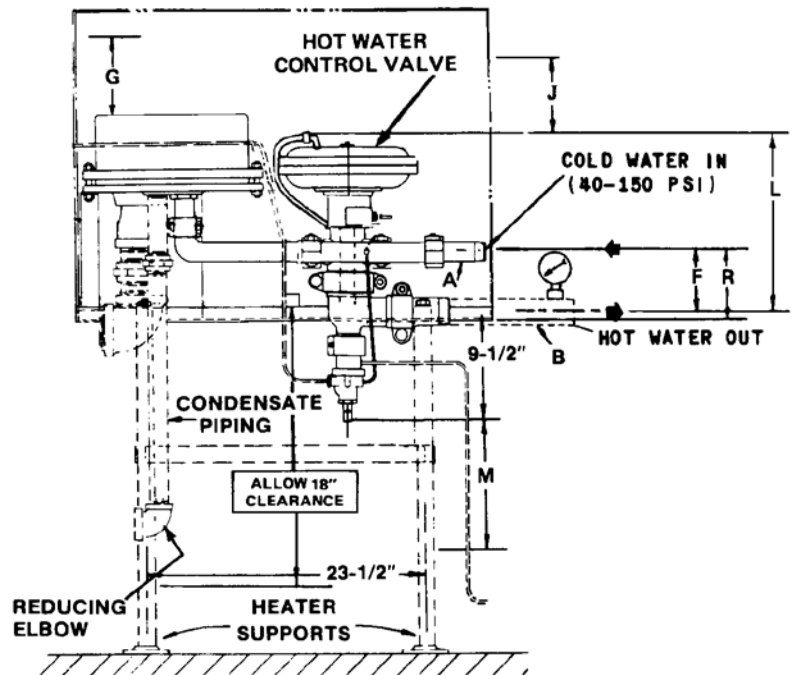
MODEL	A	B	C	D	E	F	G	H	J	K	L	WGT.*
E1500L, E300L	22½ (571.3)	21 (533.4)	¾ (19.1)	1⅜ (25.4)	1¼ (-98.4)	⅝ (174.6)	12½ (317.5)	4 (101.6)	⅝ (138.1)	15⅜ (452.4)	31½ (800.1)	270 (122.5)
E4500L, E600L	22½ (571.3)	21 (533.4)	¾ (19.1)	1 (25.4)	-3⅞ (-98.4)	⅝ (174.6)	12½ (317.5)	4 (101.6)	⅝ (138.1)	17⅜ (452.4)	31½ (800.1)	600 (272)
E7500L, E900L	24 (609.6)	21½ (546.1)	1¼ (31.8)	1⅜ (46)	3⅞ (98.4)	⅝ (174.6)	10¾ (273)	2⅝ (74.6)	9 (228.6)	13⅜ (354)	29⅞ (747.7)	600 (272)
E10500L, E1200L	27⅜ (706.4)	24⅝ (617.5)	1¾ (44.5)	2⅜ (55.6)	2⅜ (60.3)	8 (203)	15¼ (387.4)	⅝ (138.1)	7⅞ (188.9)	19⅜ (507.2)	34⅜ (873.1)	720 (326.6)

* Excluding traps, strainers, etc

WEIGHTS pounds (kg)

APPROXIMATE WEIGHT	E1500L E300L	E4500L E600L	E7500L E900L	E10500L E1200L
EXCLUDING STEAM TRAP	260 (118)	350 (158.7)	600 (272.2)	720 (326.6)
STEAM TRAP	27 (12.2)	27 (12.2)	35 (15.9)	47 (21.3)
HEATER MAY BE SUPPORTED BY FLOOR, SUSPENSION OR WALL BRACKET TYPE, FLOOR TYPE SHOWN				

CONSTANTTEMP VARIABLE PRESSURE HEATER



APPLICATION DATA

- › High temperature washdowns
- › Dishwashers

OPTIONS

- › Skidded
- › Recirculation Kit
- › Insulated Cover
- › Pressure Gradient Monitor

FEATURES

- › Accuracy $\pm 3^\circ\text{F}$ Feed-Forward control
- › Greater flows at high temperature rises
- › Flows up to 60 GPM
- › Adjustable temperature 105-180°F
- › No storage tank
- › Built in safety
- › Heats water only on demand
- › High turndown
- › Fits through standard doorway

RATINGS

Adjustable temperature range	105 - 180°F (41 - 82°C)
Steam pressure	15-250 PSIG (103.5 - 1724.5 kPa)
Water pressure	50 PSI maximum (1034 kPa) Option: 250 PSI maximum (1723 kPa)
Flow ranges	15, 30, 45, 60 GPM (57, 114, 170, 227 L/min)

CONSTANTEMP VARIABLE PRESSURE HEATER

SPECIFICATIONS

Leslie Constantemp _____* variable steam pressure water heater, for use on 15-250 psig steam, consisting of an integrally piped heat exchange, mounted on a heavy duty angle iron frame, heater control package capable of supplying _____* GPM of hot water when heated from _____°F to _____°F without the use of thermostatic control devices or storage tanks. Heaters shall be capable of maintaining the ± 3°F over a flow of a few percent of 100%. The water shall flow through the tubes and steam in the shell. Steam pressure to the exchanger shall be controlled by a water loading valve on the blending valve. If recirculation is required the heater shall be equipped with an integral recirculation system with an adjustable valve to set the recirculation temperature. The recirculation system shall be integrally mounted and shall not alter the overall dimensions of the heater. The overall dimensions shall not exceed _____**. The unit shall include connections in the manifolds to measure pressures and temperatures.

* Insert model number from chart.

** Insert dimensions from chart.

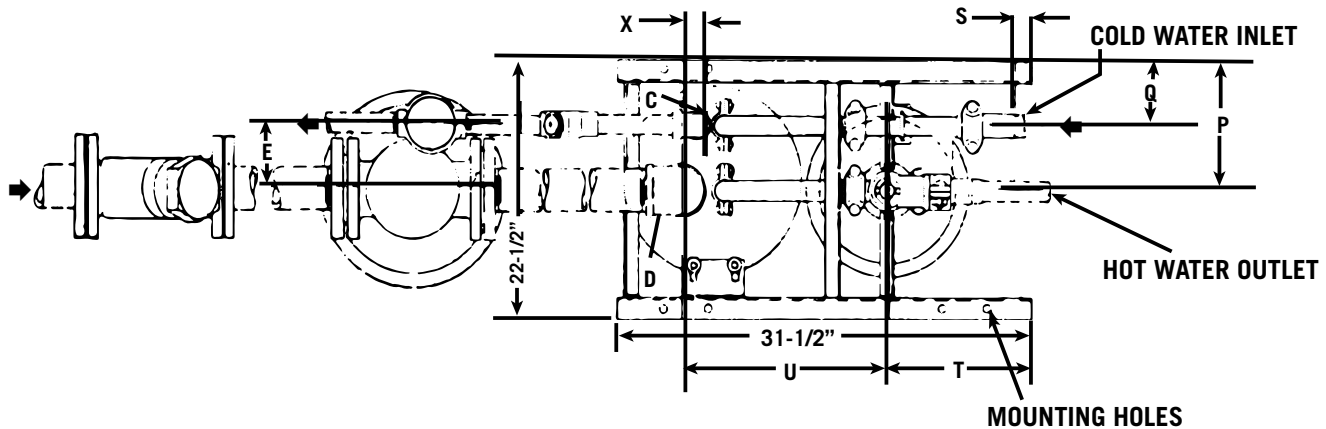
PIPING CONNECTIONS INCHES (MM)

MODEL	CW INLET	HW OUTLET	STEAM IN	CONDENSATE OUT
E1500	1 1/2 (38)	2 (50)	3 (76)	1 1/4 (32)
E300	1 1/2 (38)	2 (50)	3 (76)	1 1/4 (32)
E4500	2 (50)	2 (50)	3	2 (50)
E600	2 (50)	2 (50)	3	2 (50)

MATERIALS OF CONSTRUCTION

Exchanger	Ductile Iron (75psi) (517kPa) Cast Steel (150psi) (1034kPa) (ASME SEC. VIII div. 1)
Blending Valve	Body: Bronze Plug: Hastelloy Coils: Standard: Copper Optional: Cupro-nickel, Admiralty, Stainless Steel

BOTTOM PIPING ARRANGEMENT



Model	A B C D E					F MIN	H PSI	K PIPE SIZE	L	G	J	M	P	Q	R	S	T	U	X	Weight*
	PIPE SIZES																			
E1500 E300	1 1/2 (38.1)	2 (50.8)	1 1/4 (31.8)	3 (76.2)	4 5/8 (117.5)	5 1/4 (133.4)	30 HG VAC 100 PSIG	3 (76.2)	17 5/16 (439.7)	6 (152.4)	3 (76.2)	6 (152.4)	12 1/16 (306.4)	61 1/16 (169.9)	52 3/32 (144.5)	1 1/4 (31.8)	10 1/2 (266.7)	17 1/16 (179.4)	13/16 (30.2)	270 (122.5)
E1520 E320								4 (101.6)	21 1/4 (539.8)	10 (254)	3 (76.2)	6 (152.4)	12 1/2 (317.5)	5 5/8 (142.9)	5 3/4 (146.1)	11 1/16 (42.9)	10 1/16 (255.6)	17 1/16 (433.4)	13/16 (30.2)	
E4500 E600 E4520 E620	2 (50.8)	2 (50.8)	2 (50.8)	4 (101.6)	5 1/8 (130.2)	5 1/4 (133.4)		4 (101.6)	21 1/4 (539.8)	10 (254)	3 (76.2)	6 (152.4)	12 1/2 (317.5)	5 5/8 (142.9)	5 3/4 (146.1)	3 7/8 (98.4)	7 7/8 (200.0)	17 13/16 (452.4)	1 (25.4)	360 (163.3)

*Excluding traps, strainer, etc.

DIMENSIONS inches (mm) AND WEIGHTS pounds (kg)

CONSTANTEMP SKID MOUNTED HEATER FEATURES

APPLICATION DATA

- › See individual heaters

RATINGS

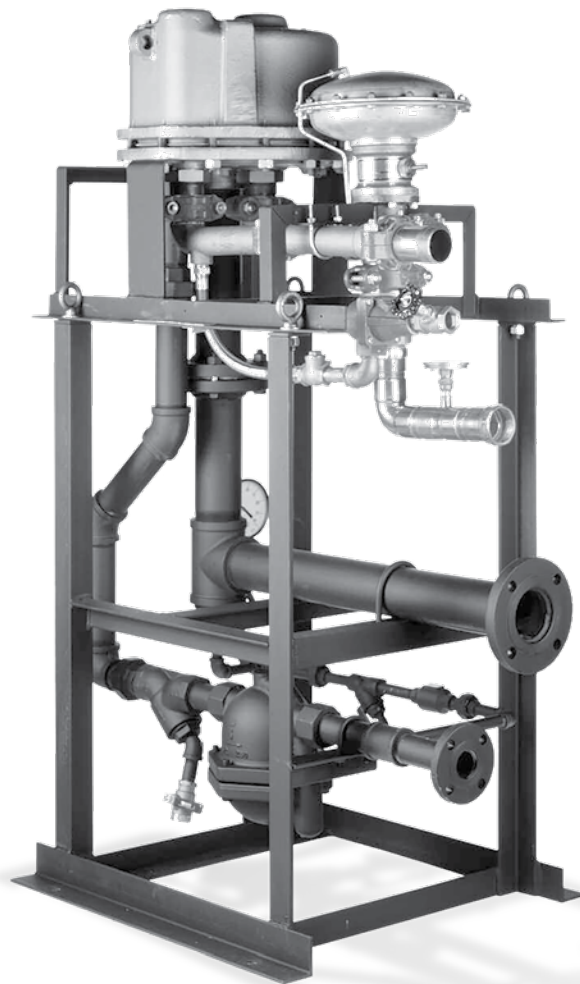
- › See individual heaters

FEATURES

- › Save Time
- › Save Manpower
- › Feed-forward control
- › Economical
- › Completely assembled
- › Only 4 connections required
 - Steam
 - Cold water
 - Hot water
 - Condensate
- › 100% Leslie components
- › 100% Leslie assembly
- › 100% pressure tested

OPTIONS

- › Recirculation Package
- › Recirculation Pump
- › Steam Reducing Valve
- › Pressure Assisted
Condensate Pump
- › Pressure Gradient Monitor



E-600L skidded steam water heating system

SIZING INFORMATION SEE INDIVIDUAL HEATERS

CONSTANTEMP SKID MOUNTED HEATER

SPECIFICATIONS

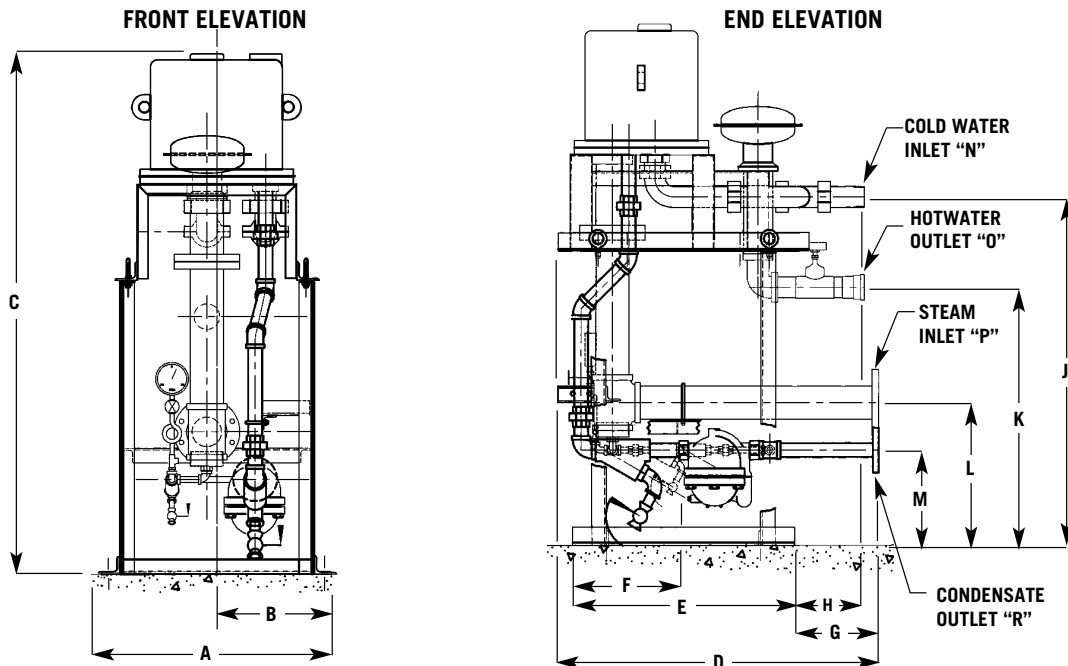
Constantemp heater to be mounted on a skid with all traps, strainers, pressure and temperatures gauges all fully assembled and piped. Complete package to be pressure tested for leaks.

Unit to be assembled so that is sufficient room between heat exchanger and traps for proper operation. Customer shall only need to hook up steam, cold water in, hot water out and condensate.

MATERIALS OF CONSTRUCTION

Heater:See Individual Heater

Skid:2 1/2 x 2 1/2 x 1/4 Angle Iron



DIMENSIONS inches (mm)

MODEL	A	B	C	D	E	F	G	H	J	K	L	M
E1500L/E300L	28 3/4 (718)	14 1/8 (359)	55 1/2 (1410)	37 1/2 (953)	30 1/2 (775)	15 1/4 (387)	6 3/8 (162)	4 1/4 (108)	45 15/16 (1167)	34 5/8 (879)	22 1/2 (572)	12 (305)
E4500L/E600L	28 3/4 (718)	14 1/8 (359)	58 3/4 (1480)	39 5/8 (1006)	30 1/2 (775)	15 1/4 (387)	8 1/2 (216)	4 3/8 (111)	46 7/8 (1188)	35 1/4 (895)	22 1/4 (565)	13 3/4 (349)
E7500L/E900L	28 3/4 (718)	14 1/4 (359)	68 3/4 (1734)	42 5/8 (1083)	30 1/2 (775)	15 1/4 (387)	11 1/2 (292)	4 3/4 (121)	47 7/8 (1210)	35 1/4 (895)	19 (483)	11 (279)
E10500L/E1200L	31 1/2 (800)	15 1/4 (387)	68 3/4 (1734)	44 (1118)	30 1/2 (775)	15 1/4 (387)	11 1/2 (292)	9 1/2 (241)	47 7/8 (1210)	35 1/4 (895)	19 (483)	11 (279)

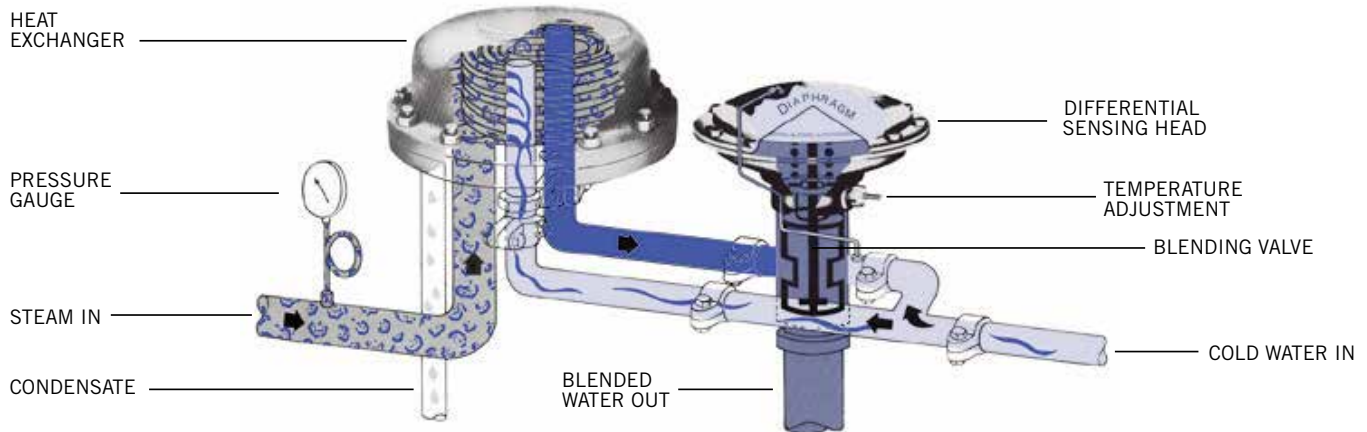
PIPING DIMENSIONS

END CONNECTION	E1500L/300L	E4500L/600L	E7500L/900L	E1050L/1200L
"N" Cold Water Inlet	1 1/2 MNPT	2 MNPT	2 1/2 MNPT	2 1/2 MNPT
"O" Hot Water Outlet	2 FNPT	2 FNPT	2 1/2 FNPT	2 1/2 FNPT
"P" Steam Inlet	3 150# Fig. RF	3 150# Fig. RF	4 150# Fig. RF	4 150# Fig. RF
"R" Condensate Outlet	1 150# Fig. RF	1 1/2 150# Fig. RF	1 1/2 150# Fig. RF	1 1/2 150# Fig. RF

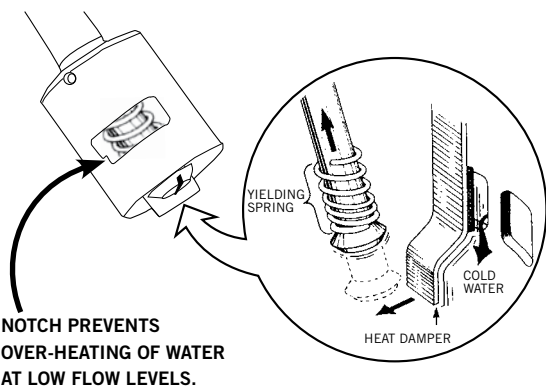
Dimensions are approximate and may vary slightly then shown. All dimensions are in inches. Standard tolerance for location of all pipe connections and envelope dimensions is plus or minus 1/2".

ECONOSTEAM™ COMPACT PRE-PIPED DESIGN & FEEDFORWARD OPERATION

QUALITY, DURABILITY, SAVINGS ECONOSTEAM™ FOR MOST APPLICATIONS - (CONSTANT STEAM PRESSURE)



TWO INNOVATIONS TO ENSURE SAFETY



Should movement of the blending valve be restricted by foreign matter carried in the water, a yielding spring arrangement allows the diaphragm and stem to move up, uncovering a heat damper in the characterized blending valve. This damper allows cold water to enter the blended mix, eliminating the possibility of overheating or scalding.

MATERIALS OF CONSTRUCTION

Exchanger Ductile Iron: (single wall only) (75 psi) (517 kPa)
Cast Steel: (150 psi) (1034 kPa) (ASME SEC. VIII div. 1)

Economizer Brazed plate and frame heat exchanger
 (316L SS plates, copper brazed)

Blending Valve

Body: Bronze

Coils Standard: Copper

Optional Double Wall: Admiralty, Cupro-nickel, Stainless Steel

OPTIONS

- › Insulated Cover
- › Skidded
- › Pressure Gradient Monitor
- › Recirculation Kit
- › High-Capacity Economizer System

RATINGS

Adjustable temperature range: 45-120 GPM: 105-180°F (41-82°C)
 15 and 30 GPM: 105-150°F (41-65°C)

Steam pressure: 2-250 PSIG (14-1725 kPa) over 15 PSIG (104 kPa), requires steam reducing valve

Water pressure: 150 PSI max. (1034 kPa)

Option: 250 PSI max. (1723 kPa) (single wall only)

Flow ranges: Single Wall: 15, 30, 45, 60, 75, 90, 105, 120 GPM (57, 114, 170, 227, 284, 341, 397, 454 L/min)

Double wall: 30, 60, 90, 120 GPM (114, 227, 341, 454 L/min)

* For higher steam pressure use a pressure regulator to reduce pressure to 15 psi.

APPLICATION DATA

- › Hospital Patient & Domestic Hot Water
- › University Dormitories
- › Safety Shower Systems
- › Industrial Shower Rooms
- › Booster Heater
- › Building Heat

WARRANTY

The main heat exchanger shall carry an extended warranty in addition to the manufacturers warranty as follows:

COILS: The heat exchanger coils shall carry an unconditional, non-prorated 10-year guarantee against failure due to thermal shock, mechanical failure or erosion.

PRESSURE VESSEL: The heat exchanger pressure vessel shall carry an unconditional, non-prorated 10 year guarantee against any failure.

All other parts of the package, such as blending valve, gauges and traps, etc. have the standard LESLIE warranty.

ECONOSTEAM™ HEATER

FEATURES

- › Energy-Saving Economizer
- › Fits LEED-Certified Projects
- › Feed-Forward Control
- › Flows up to 120 GPM
- › Adjustable Temperature 105-180°F
- › No Storage Tank Required
- › Built In Safety
- › Heats Water Only on Demand
- › Fits Through Standard Doorways
- › High Turndown

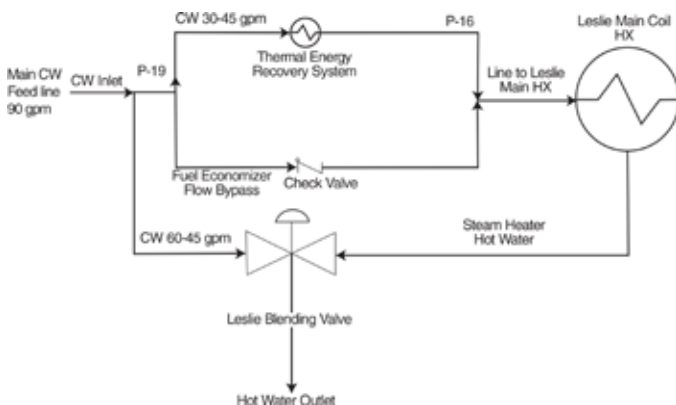
LESLIE ECONOSTEAM™ CONSTANTEMP HEATER

Leslie EconoSteam™ Constantemp Heater Model _____ steam water heater, for use on 2-250 psig steam, consists of an integrally piped helical designed coil and heat exchanger, with feed forward blending valve actuated by differential pressure mounted on a heavy-duty steel frame with all traps, strainers, pressure and temperature gauges necessary, fully assembled and piped. Factory certified pressure tested for leaks.

The integral blending valve shall have a differential pressure sensing head with a bronze body and Hastelloy plug. The differential pressure head shall sense flow rate and mix the proper amounts of hot and cold water to control the final temperature. The heater shall have an integral safety feature, should the movement of the blending valve be restricted by foreign matter carried in the water. A yielding spring arrangement will allow the diaphragm and stem to move up, un-covering a heat damper in the characterized blending valve. This damper shall allow cold water to enter the blended mix, eliminating the possibility of ever obtaining over-heated or scalding water.

The water shall flow through the tubes and the steam in the shell. When the hot water system has recirculation, each heater shall be equipped with a Leslie EconoSteam™ Water Heater

LESLIE ECONOSTEAM™ WATER HEATER



Leslie recirculation system kit, with a non-adjustable valve to set the recirculation temperature and prevent temperature creep during low peak times and shall be equipped with a Thermal Energy Recovery System (TERS).

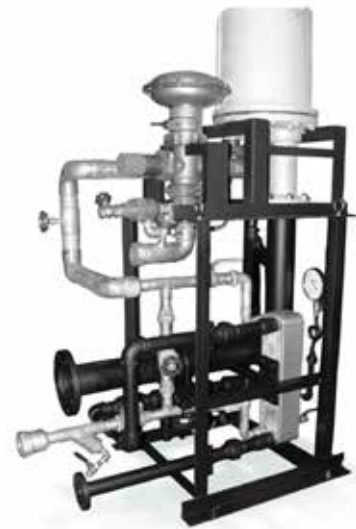
The Thermal Energy Recovery System (TERS) shall include a condensate cooler to be a brazed plate and frame exchanger. TERS will pre-heat incoming and/or makeup cold water while sub-cooling hot condensate prior to discharging it, thus recovering additional energy.

Each heater control package shall be capable of supplying 100% of hot water when heated from __ degrees F to __ degrees F for a total of -__GPM without the use of thermostatic control devices or storage tanks. Heater shall be capable of maintaining +/- 3 degrees F set point over a flow range of a few percent to 100 percent, while recovering and using condensate to pre-heat cold water through a thermal energy recovery system (TERS).

As an added safety feature, if equipped with a recirculation pump, then a temperature switch measures the return water temperature to prevent over-tempering conditions.

Warranty of the coil shall have a ten-year unconditional non-prorated guarantee against failure due to thermal shock, mechanical failure or erosion. The heat exchanger pressure vessel shall carry an unconditional non-prorated 10-year guarantee against failure.

Heater shall be constructed with integral design such that it can be considered and approved for LEEDS points.



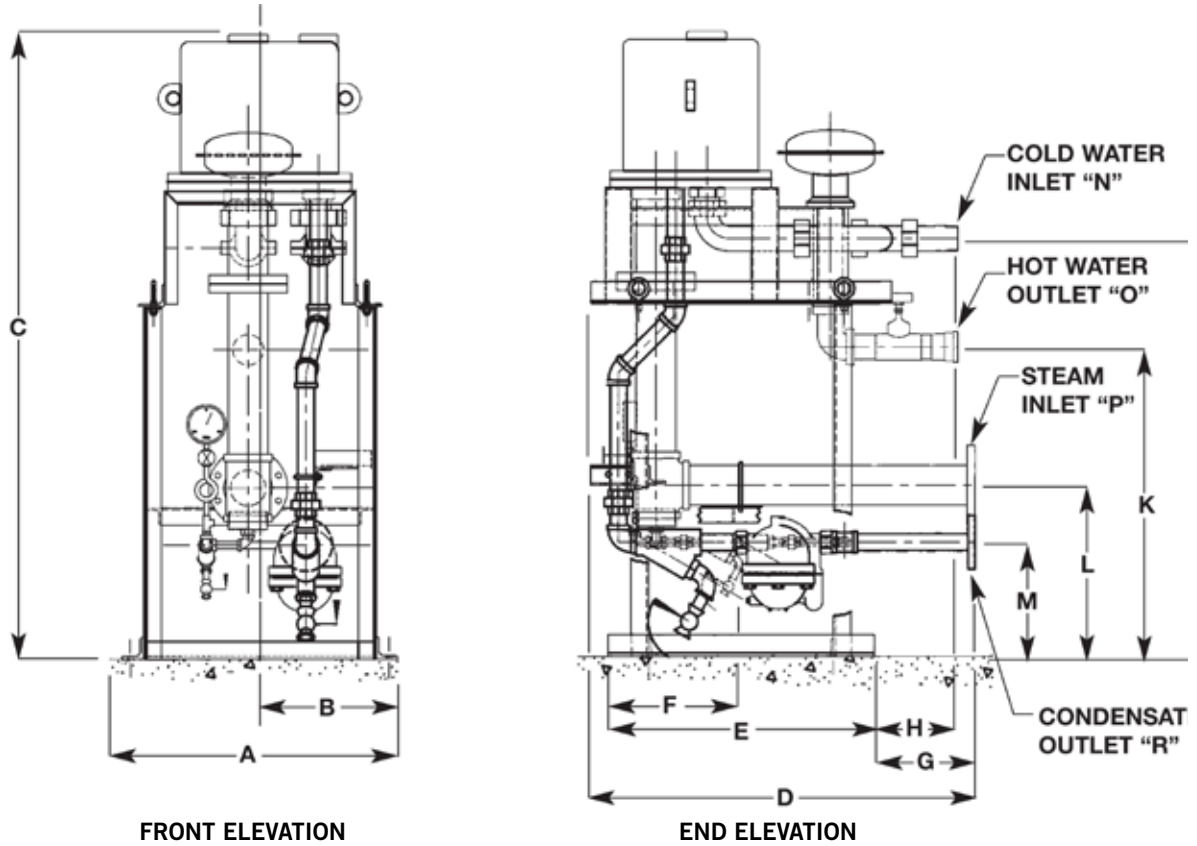
**ECONOSTEAM™
SKID MOUNTED
HEATER**

SPECIFICATIONS (SKID-MOUNTED)

EconoSteam™ heater to be mounted on a skid with all traps, strainers, pressure and temperature gauges all fully assembled and piped. Complete temperature package to be pressure tested for leaks. Unit to be assembled so there is sufficient room between heat exchanger and traps for proper operation. Customer shall only need to hook up steam, cold water in, hot water out and condensate.

ECONOSTEAM™ SKID MOUNTED HEATER

100% LESLIE ASSEMBLY, 100% PRESSURE TESTED



Model	A	B	C	D	E	F	G	H	J	K	L	M		
E1500L/E300L	28 1/4 (718)	14 1/8 (359)	55 1/2 (1410)	37 1/2 (953)	30 1/2 (775)	15 1/4 (387)	6 3/8 (162)	4 1/4 (108)	45 15/16 (1167)	34 5/8 (879)	22 1/2 (572)	12 (305)	22.5 (559)	12 (305)
E4500L/E600L	28 1/4 (718)	14 1/8 (359)	58 1/4 (1480)	39 5/8 (1006)	30 1/2 (775)	15 1/4 (387)	8 1/2 (216)	4 3/8 (111)	46 7/8 (1188)	35 1/4 (895)	22 1/4 (565)	13 3/4 (349)	22 1/4 (565)	13 3/4 (349)
E7500L/E900L	28 1/4 (718)	14 1/4 (359)	68 1/4 (1734)	42 5/8 (1083)	30 1/2 (775)	15 1/4 (387)	11 1/2 (292)	4 3/4 (121)	47 5/8 (1210)	35 1/4 (895)	19 (483)	11 (279)	19 (483)	11 (279)
E10500L/E1200L	31 1/2 (800)	15 1/4 (387)	68 1/4 (1734)	44 (1118)	30 1/2 (775)	15 1/4 (387)	11 1/2 (292)	9 1/2 (241)	47 5/8 (1210)	35 1/4 (895)	19 (483)	11 (279)	19 (483)	11 (279)

FOR SIZING INFORMATION SEE INDIVIDUAL HEATERS

End Connection	E1500L/300L	E4500L/600L	E7500L/900L	E1050L/1200L
"N" Cold Water Inlet (2x)	1 1/2 MNPT	2 MNPT	2 1/2 MNPT	2 1/2 MNPT
"O" Hot Water Outlet (1)	2 FNPT	2 FNPT	2 1/2 FNPT	2 1/2 FNPT
"P" Steam Inlet (1)	3 150# Fig. RF	3 150# Fig. RF	4 150# Fig. RF	4 150# Fig. RF
"R" Condensate Outlet (1)	1 150# Fig. RF	1 1/2 150# Fig. RF	1 1/2 150# Fig. RF	1 1/2 150# Fig. RF

Dimensions are approximate and may vary slightly than shown. All dimensions are in inches. Standard tolerance for location of horizontal pipe are plus or minus 2" and vertical is plus or minus 1 1/2".

Since LESLIE CONTROLS was founded in 1900, we have been an industry leader in quality fluid control equipment. We have developed a full line of engineered products to suit your requirements, including diaphragm control valves, control instrumentation, pressure and temperature regulators and steam water heaters.

CONSTANTCOIL™ HEAT EXCHANGERS

APPLICATION DATA

- › Process Heating Sanitation
- › Process Booster Heater
- › High temperature washdowns

RATINGS

Exchanger: 75 psi rating - Ductile Iron 150 psi rating - Cast Steel

Size: 15, 30, 45, 60, 75, 90, 105 & 120 gpm

Liquid pressure: 150 PSI maximum Option: 250 PSI maximum (1732 kPa)

FEATURES

- › Helical Coil
- › Compact
- › Efficient
- › Single Source System
- › 100% Leslie assembly
- › Ductile Iron or Steel Shell
- › Four choices of coil material

OPTIONS

- › A.S.M.E. Stamp
- › Electronic Descaling
- › Insulated Covers
- › Steam Pressure Reducing Valves



SIZING INFORMATION SEE PAGE 38

CONSTANTCOIL™ HEAT EXCHANGERS

SPECIFICATIONS

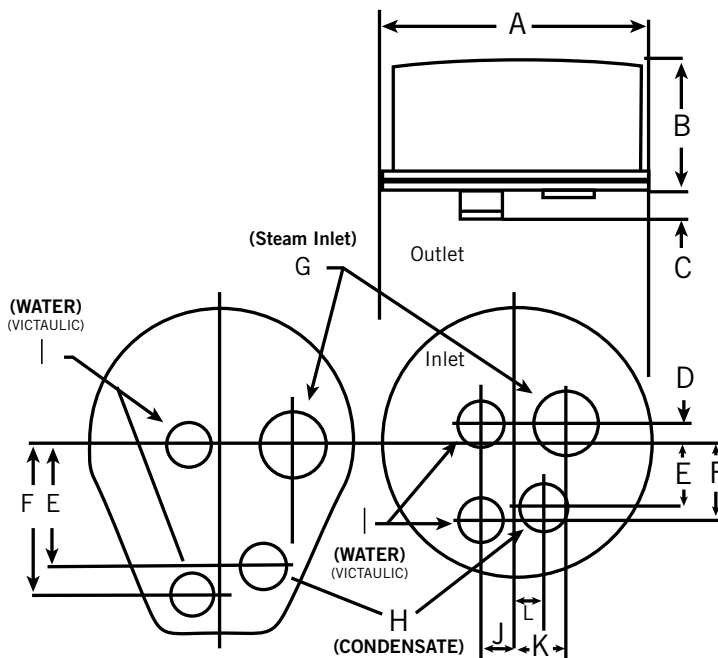
The Leslie ConstantCoil™ is a compact, highly efficient, steam/liquid instantaneous heat exchanger, offering maximum heat exchange surface in a minimum amount of space.

ConstantCoil™ heat exchangers are basically a shell and a tube type with steam in the shell and liquid in the tubes.

ConstantCoil™ compactness and energy efficiency are derived from the spiral wound copper tubes which provide a huge heat transfer area in a very small package.

MATERIALS OF CONSTRUCTION

Coil: Standard	Copper
Optional	Admiralty, Cupro-nickel, Stainless Steel
Shell	Ductile Iron, Carbon Steel (ASME SEC. VIII div. 1)
Water Connections: Standard	Victaulic
Optional	Threaded (NPT)



DIMENSIONS inches (mm) AND WEIGHTS pounds (kg)

MODEL	A	B	C	D	E	F	G	H	I	J	K	L	WGT.
E1500L/E300L	15 1/2 (394)	7 (178)	2 5/16 (59)	13/16 (21)	3 13/16 (97)	4 9/16 (116)	3 (76)	1 1/4 (32)	1 1/4 (32)	1 5/16 (24)	2 3/4 (70)	1 9/16 (40)	122 (55)
E4500L/E600L	17 7/8 (454)	10 5/8 (270)	1 13/16 (46)	—	5 1/8 (130)	6 7/8 (175)	3 (76)	2 (51)	2 (51)	1 7/16 (37)	3 3/8 (86)	2 3/8 (60)	198 (90)
E7500L/E900L	17 7/8 (454)	18 1/8 (460)	11 13/16 (46)	—	5 1/2 (140)	6 7/8 (175)	4 (102)	1 1/2 (38)	2 (51)	1 7/16 (37)	3 3/8 (86)	1 9/16 (40)	325 (147)
E10500L/E1200L	18 1/2 (470)	18 1/2 (470)	3 1/16 (78)	—	8 (203)	8 (203)	4 (102)	1 1/2 (38)	2 1/2 (64)	11 3/16 (46)	4 (102)	1 13/16 (46)	397 (180)

LES PACKAGED WATER HEATER

APPLICATION DATA

- › Hospital patient and domestic hot water
- › Industrial shower rooms
- › Building heat
- › University dormitories

RATINGS

- › Shell: 150 psi
- › Tubes: 150 psi

FEATURES

- › Compact size
- › Flows to 330 GPM
- › Steam or HTHW as heating source
- › Stainless steel tank
- › $\pm 5^{\circ}\text{F}$ accuracy
- › Industrial quality steam control valve
- › Coil can be removed without disturbing heater

OPTIONS

- › Double wall coils
- › Vacuum breaker
- › 235 MAW pressure rating



SIZING INFORMATION SEE PAGE 39

LES PACKAGED WATER HEATER

SPECIFICATIONS

For specifying a LES Series Steam-Fired Water Heater, select the model(s) from the charts provided and use the specifications covered below. Contact your local Leslie representative or consult the factory. Heater shall be Leslie Series "LES" factory assembled and packaged, rated to heat specified GPM of water from _____ to _____ °F, temperature rise and control the outlet within $\pm 5^{\circ}\text{F}$ of the selected temperature when supplied with _____ psig saturated steam before the control valve. The packaged water heater shall be constructed with a 316L Stainless Steel tank, with Stainless Steel threaded openings, copper coil, 1/2" tubes, copper lined tube sheet and fabricated steel steam chamber.

Heater shall be mounted on a steel support skid and shall have lifting lugs. Heater shall be foam insulated and protected by an enameled metal jacket, 20 gauge minimum thickness. Heater shall be factory assembled and piped including:

Steam Units - Incoming steam strainer, pneumatic control valve, main and auxiliary float and thermostatic steam traps.

Coil shall be baffled and shall have an integral bronze valve circulator with shut off valves to circulate the water across the coil.

Heater shall be furnished with A.S.M.E. pressure-temperature relief valve of sufficient size to relieve total BTU input of the coil, water thermometer, water pressure gauge and steam pressure gauge.

For Vertical - Heater shall be Leslie Controls, Inc.

Model V _____ LES _____

For Horizontal - Heater shall be Leslie Controls,

Inc. Model H _____ LES _____

MATERIALS OF CONSTRUCTION

Coil: Standard	Copper
Optional	Cupro-nickel, Stainless Steel
Shell	316 L SS
Piping	Copper
Circulating Pump	Bronze

BASIC LES PACKAGE COMPONENTS:

- › Compact size
- › A.S.M.E. Code constructed National Board registered storage tank
- › Pressure Rating 150 psig (10 bar) 316-L Stainless steel tanks
- › 316-L Stainless steel threaded connections 2" (5 cm) Foam insulation
- › 20 Gauge steel jacket with hammer tone enamel paint Structural steel base
- › A.S.M.E. relief valve pressure and temperature
- › Digital thermometer
- › Water pressure gauge
- › Drain Valve
- › Copper U-Bend heating coil, rolled into copper lined tube sheet
- › Integral bronze circulator
- › High temperature cutoff
- › Double safety solenoid system

STANDARD STEAM PACKAGE COMPONENTS

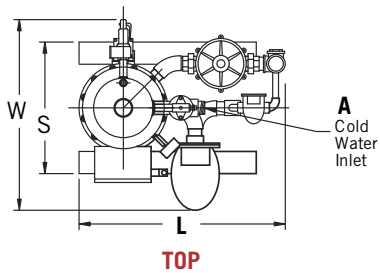
- › Steam temperature control valve
- › Steam traps-main inlet and auxiliary
- › Steam stainer, inlet
- › Steam pressure gauge

STANDARD BOILER WATER/HIGH TEMPERATURE HOT WATER PACKAGE COMPONENTS

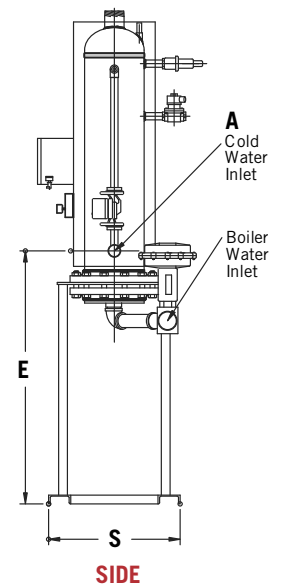
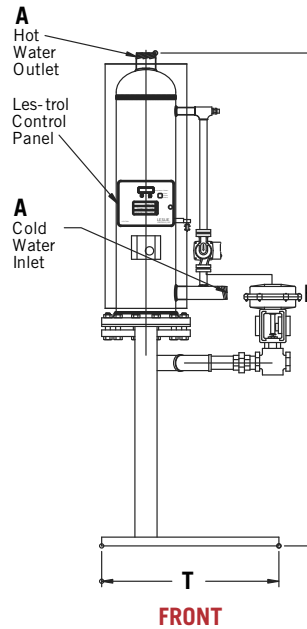
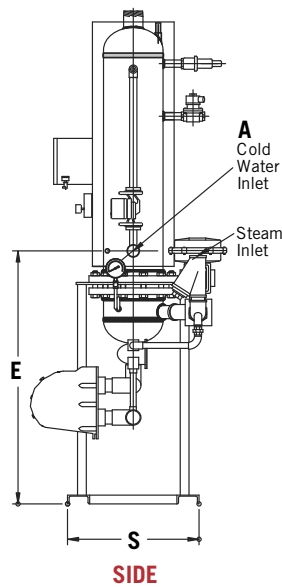
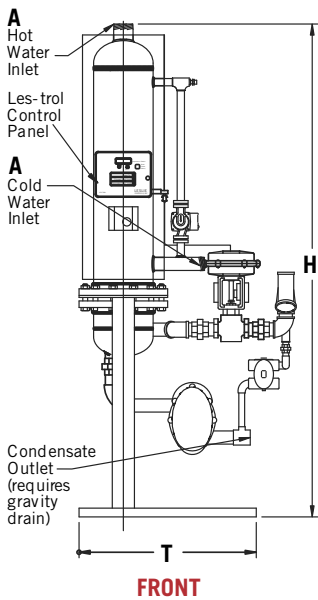
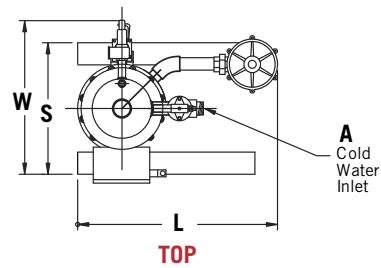
- › Boiler water control valve (Two way or three way) Boiler water temperature gauge
- › High temperature hot water units with 90:10 CuNi tubing. 400 psi (27 bar) maximum pressure

LES PACKAGED WATER HEATER DIMENSIONS – VERTICAL

STEAM



BOILER WATER



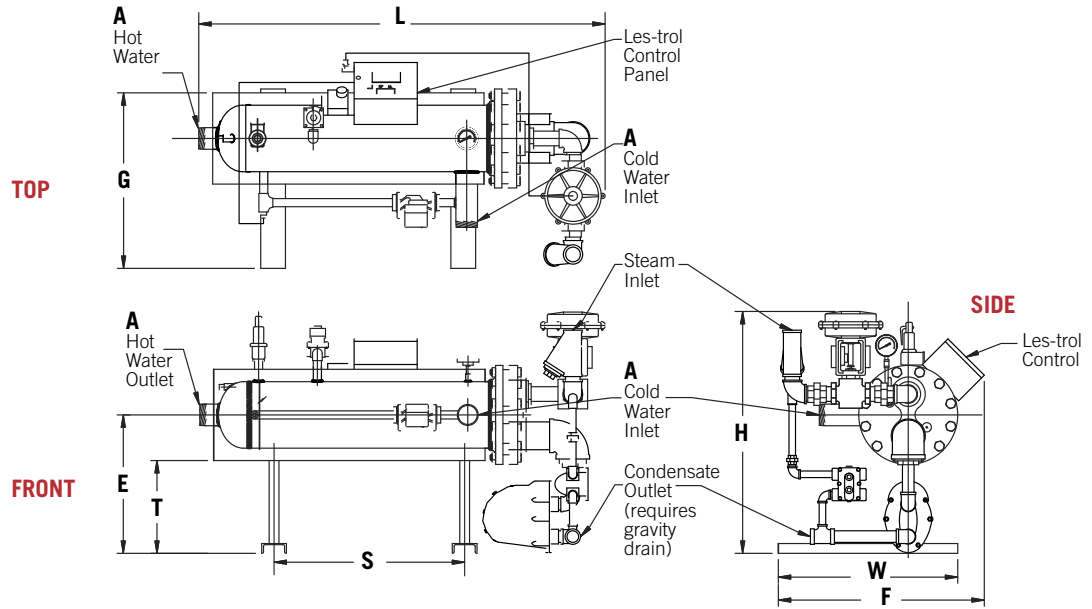
VERTICAL CONFIGURATION DIMENSIONS inches (mm)

MODEL #	H*	L*	W*	S	T	A	E
V6LES624	84 (2134)	33 (838)	31 (787)	18¾ (476)	24 (610)	2 M.N.P.T. (51)	38½ (978)
V6LES636	84 (2134)	33 (838)	31 (787)	18¾ (476)	24 (762)	2½ M.N.P.T. (64)	38½ (978)
V8LES830	84 (2134)	33 (838)	30 (762)	21¼ (540)	30 (762)	2½ M.N.P.T. (64)	38½ (978)
V10LES1030	83 (2108)	36 (914)	33 (838)	23¾ (603)	32 (813)	2½ M.N.P.T. (64)	40 (1016)
V10LES1036	89 (2261)	36 (914)	33 (838)	23¾ (603)	32 (813)	3 M.N.P.T. (76)	46 (1168)
V12LES1236	89 (2261)	37 (940)	35 (889)	26¾ (679)	34 (864)	3 M.N.P.T. (76)	46 (1168)
V12LES1242	102 (2591)	37 (940)	35 (889)	26¾ (679)	34 (864)	3 M.N.P.T. (76)	52 (1321)
V14LES1442	103 (2616)	38 (965)	35 (889)	28¾ (730)	36 (914)	4 - 150# flange (102)	54 (1372)

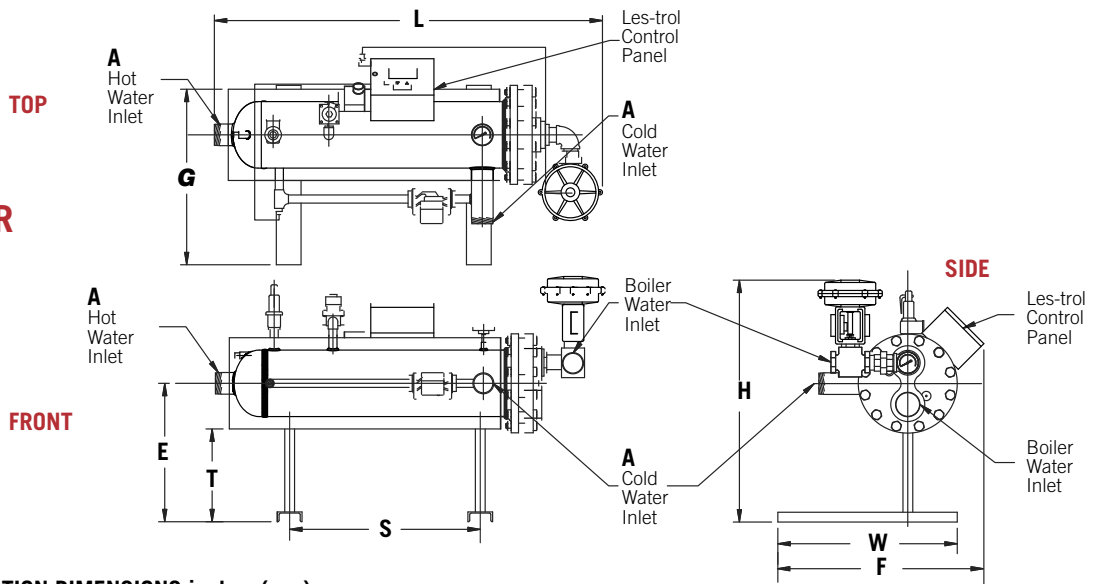
* Approximate

LES PACKAGED WATER HEATER DIMENSIONS - HORIZONTAL

STEAM



BOILER WATER

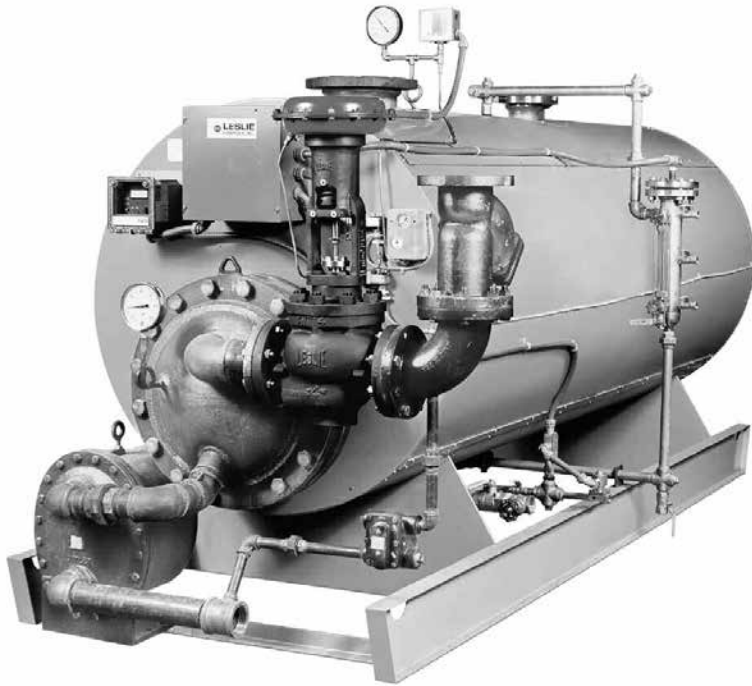


HORIZONTAL CONFIGURATION DIMENSIONS inches (mm)

MODEL #	H*	L*	W*	S	T	A	E	F*	G
H6LES624	35 (889)	65 (1651)	25 (635)	36 (914)	15 (381)	2 M.N.P.T. (51)	20½ (521)	29½ (749)	25 (635)
H8LES636	35 (889)	65 (1651)	25 (635)	36 (914)	15 (381)	2 M.N.P.T. (51)	20½ (521)	29½ (749)	28½ (724)
H8LES830	36 (914)	65½ (1664)	29 (737)	35½ (902)	15 (381)	2½ M.N.P.T. (64)	21½ (546)	32½ (826)	28½ (724)
H10LES1030	39 (991)	65½ (1664)	29 (737)	34 (864)	15 (381)	3 M.N.P.T. (76)	22½ (572)	32 (813)	28½ (724)
H10LES1036	41 (1041)	65½ (1664)	29 (737)	34 (864)	15 (381)	3 M.N.P.T. (76)	22½ (572)	32 (813)	28½ (724)
H12LES1236	41 (1041)	66 (1676)	31 (787)	34 (864)	15 (381)	3 M.N.P.T. (76)	23½ (597)	33½ (851)	30 (762)
H12LES1242	41 (1041)	73 (1854)	31 (787)	39½ (1003)	15 (381)	3 M.N.P.T. (76)	23½ (597)	33½ (851)	30 (762)
H14LES1442	41 (1041)	74½ (1892)	35 (889)	39½ (1003)	15 (381)	4 flange (102)	24 (610)	37½ (953)	33½ (851)

* Approximate

UNFIRED STEAM GENERATORS



APPLICATION DATA

- › Clean steam
- › Humidification
- › Sterilization
- › Food processing
- › Parts cleaning

RATINGS

Steam pressure	0 - 125 psi (8.6 bar) steam
Steam flow	0 - 20,000 #/hr of steam
Source steam	10 - 125 psi (.7-8.6 bar)
Source hot water	250 - 500°F (121-260 bar)

FEATURES

- › Steam or high temperature water as energy source
- › Stainless steel or carbon steel construction
- › A.S.M.E. code constructed
- › Horizontal or vertical construction

OPTIONS

- › Vacuum Breaker
- › Bell
- › Control
- › Centrifugal Boiler BlowOff/Condensate Cooler (CBO) High Water Cut Off
- › Make-up Water Feeding options
- › Solenoid Valve
- › Feed Water Pump
- › Automatic Blowdown Options
- › Automatic Blowdown - Time Method
- › Automatic Blowdown - Total Dissolved Solids Method

The Leslie unfired steam generators are designed to produce clean steam with steam or high temperature hot water as an energy source.

SIZING INFORMATION
CONSULT FACTORY

UNFIRED STEAM GENERATORS

SPECIFICATIONS

Unfired Steam Generator shall be manufactured by Leslie Controls, Tampa, FL.

Unfired Steam Generator shall be furnished as a complete package ready for installation.

Unfired Steam Generator shall be ASME Code constructed and stamped in accordance with Section VIII, Division I, for Unfired Steam Generators.

Unfired Steam Generators shall be registered with the National Board of Boiler and Pressure Vessel Inspectors, and signed copy of shop inspection report shall be furnished. Unfired Steam Generator shall be built in accordance with Section VIII "Unfired Steam Generators" and shall bear the "UB" stamp.

Unfired Steam Generator and all components subject to steam side shall be (316-L grade stainless) (carbon) steel.

Unfired Steam Generator shall be insulated with not less than 3" of Fiberglass insulation, protected by not less than 20 ga. thick enameled steel jacket.

Unfired Steam Generator shall be mounted on a suitable I-Beam support skid, which shall be permanently welded to the shell.

Unfired Steam Generator shall have submerged coil of (16) (18) (20) BWG (copper) (90:10 Copper-Nickel) ((316) (304) stainless steel tubes) expanded into a (steel) ((316) (304) stainless steel) tube sheet with cast iron heads.

Unfired Steam Generator shall be furnished with ASME Code Section I pressure relief valve or valves with a capacity to relieve the total BTU of output of the generator.

All components for the Unfired Steam Generator shall be factory mounted, piped, and tested and the unit shall be shipped from the factory as a complete unit ready for installation. Unfired Steam Generator shall be furnished with a steam separator.

MATERIALS OF CONSTRUCTION

Tubes	Copper, 90:10 Copper-nickel, 304 or 316 Stainless Steel
Coil Head	Cast Iron, or Carbon Steel
Level Control	Cast Iron or Stainless Steel

ADDITIONAL SPECIFICATIONS FOR HIGH TEMPERATURE HOT WATER AS ENERGY SOURCE

Unfired Steam Generator shall be furnished with an (air) (electronic) operated (2) (3) - way control valve to modulate the in-coming HTHW to maintain the desired output of steam pressure ± 2 psi. Control valve shall be suitable for 400 psi at 400°F. Control valve pilot shall monitor output steam pressure and modulate the HTHW to maintain constant output pressure.

Unfired Steam Generator shall be furnished with a vessel steam gauge, thermometer to monitor the incoming HTHW temperature. Unfired Steam Generator shall be furnished with (electronic) (float type) level controller. Water column shall also be furnished with gauge glass.

Unfired Steam Generator shall be furnished with tandem blow off valves.

Unfired Steam Generator shall be Leslie Model _____, designed with an output of _____ pound per hour at _____ psi pressure and feed water of _____ °F. when supplied with _____ GPM of _____ °F boiler water.

ADDITIONAL SPECIFICATIONS FOR STEAM AS ENERGY SOURCE

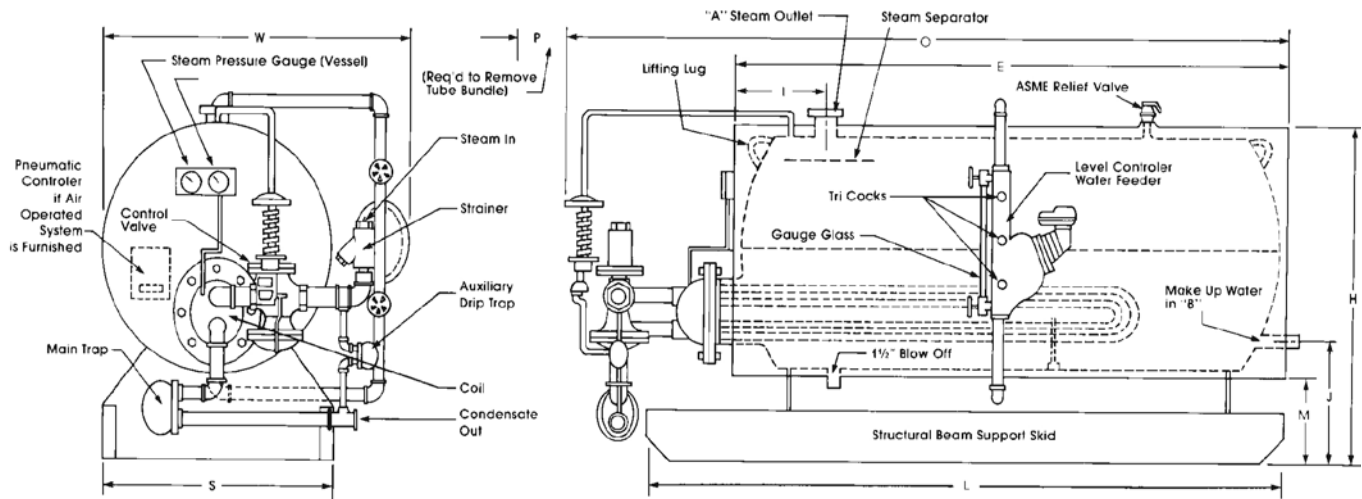
Unfired Steam Generator shall be furnished with an (air) (pilot) (electric) operated control valve to modulate the incoming steam to maintain the desired output of steam pressure ± 2 psi. Control valve shall be suitable for 150 psi. Control valve pilot shall monitor output steam pressure and modulate the steam to maintain constant output pressure.

Unfired Steam Generator shall be factory supplied with dual float and thermostatic traps, one for the coil and one for the drip before the control valve. Unfired Steam Generator shall have incoming strainer.

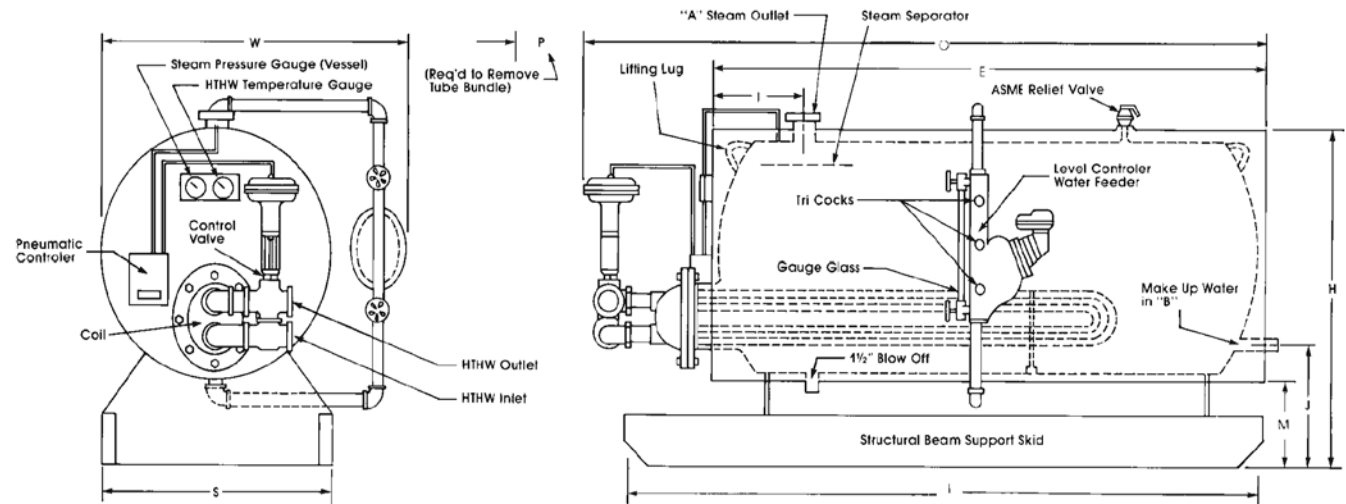
Unfired Steam Generator shall be furnished with a vessel steam gauge. Unfired Steam Generator shall be furnished with electronic level controller. Water column shall also be furnished with gauge glass. Unfired Steam Generator shall be furnished with tandem blow off valves.

Unfired Steam Generator shall be Leslie Model _____, designed with an output of _____ pounds per hour at _____ psi pressure and feed water of _____ °F. when supplied with _____ psi steam to the control valve.

UNFIRED STEAM GENERATORS DIMENSIONS – HORIZONTAL



HORIZONTAL - ENERGY SOURCE: STEAM



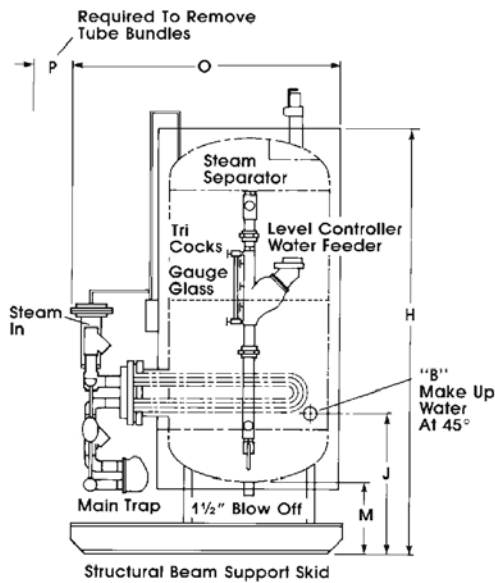
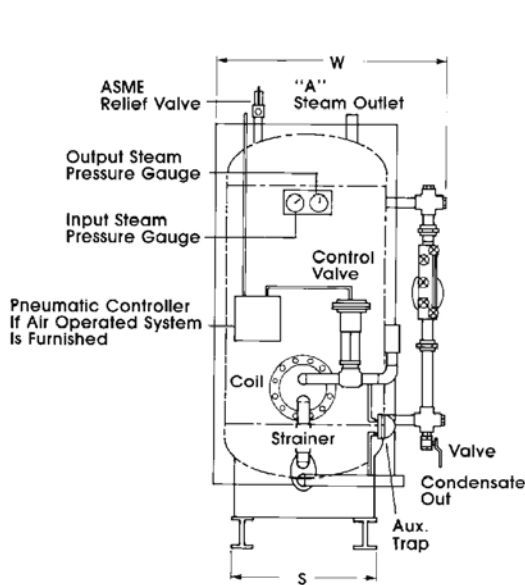
HORIZONTAL - ENERGY SOURCE: HIGH TEMPERATURE HOT WATER HORIZONTAL CONFIGURATION DIMENSIONS INCHES (MM)

MODEL NUMBER	BOILER VESSEL SIZE	W	H	O	S	E	M	J	I	P*	A**	B	L
H60LUSG	20 x 48 (508 x 1219)	34 (864)	42 (1067)	70 (1778)	24 (610)	52 (1321)	18 (457)	24 (610)	17 (432)	48 (1219)	1 1/2 NPT (38)	3/4 NPT (19)	64 (1626)
H120LUSG	24 x 63 (610 x 1600)	38 (965)	46 (1168)	84 (2134)	28 (711)	67 (1702)	18 (457)	24 (610)	17 (432)	60 (1524)	1 1/2 NPT (38)	3/4 NPT (19)	79 (2007)
H205LUSG	30 x 72 (762 x 1829)	44 (1118)	49 (1245)	95 (2413)	34 (864)	76 (1930)	15 (381)	21 (533)	18 (457)	72 (1829)	2 NPT (50)	1 NPT (25)	88 (2235)
H395LUSG	36 x 96 (914 x 2438)	50 (1270)	52 (1321)	123 (3124)	40 (1016)	100 (2540)	12 (305)	20 (508)	20 (508)	96 (3438)	3 NPT (76)	1 NPT (25)	112 (2845)
H670LUSG	42 x 120 (1067 x 3048)	56 (1422)	58 (1473)	151 (3835)	46 (1168)	124 (3150)	12 (305)	20 (508)	22 (559)	120 (3048)	4 FLG (102)	1 1/2 NPT (38)	140 (3556)
H860LUSG	48 x 12 (1219 x 3048)	62 (1575)	64 (1626)	149 (3785)	52 (1321)	124 (3150)	12 (305)	20 (508)	24 (610)	120 (3048)	5 FLG (127)	1 1/2 NPT (38)	140 (3556)
H1085LUSG	54 x 120 (1372 x 3048)	68 (1727)	70 (1778)	152 (3861)	58 (1473)	124 (3150)	12 (305)	22 (559)	28 (711)	120 (3048)	6 FLG (152)	2 NPT (51)	140 (3556)

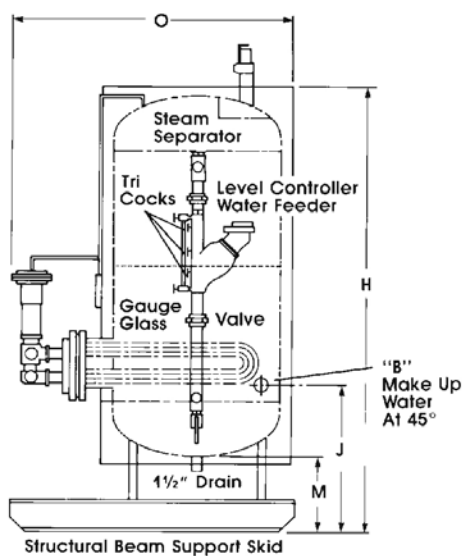
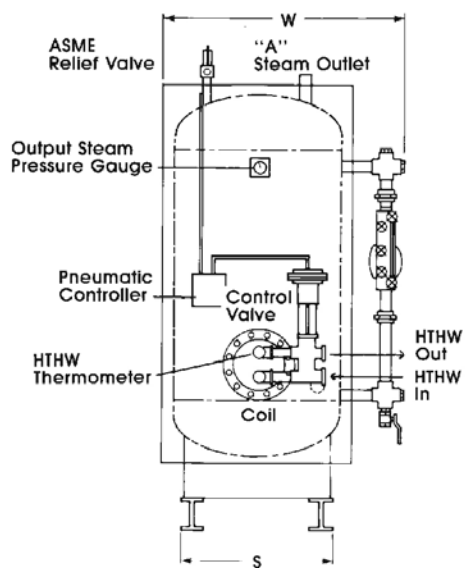
* This dimension is for the longest coil available, shorter coils with a corresponding shorter "P" dimension are available. Consult factory.

** Dimension A can be changed to suit customer requirements.

UNFIRED STEAM GENERATORS DIMENSIONS – VERTICAL



**VERTICAL ENERGY
SOURCE: STEAM**



**VERTICAL
ENERGY SOURCE:
HIGH TEMPERATURE
HOT WATER**

VERTICAL CONFIGURATION DIMENSIONS INCHES (MM)

MODEL NUMBER	W	H	O	S	M	J	P	A	B
V45LUSG	34 (864)	50 (1270)	36 (914)	20 (508)	10 (254)	20 (508)	10 (254)	1 1/2 (38)	3/4 (19)
V90LUSG	38 (965)	62 (1575)	42 (1067)	20 (508)	10 (254)	24 (610)	14 (356)	2 (50)	3/4 (19)
V160LUSG	44 (1118)	68 (1727)	48 (1219)	24 (610)	10 (254)	28 (711)	20 (508)	3 (76)	1 (25)
V240LUSG	50 (1270)	74 (1880)	54 (1372)	30 (762)	10 (254)	28 (711)	26 (660)	4 FLG (102)	1 (25)
V320LUSG	56 (1422)	74 (1880)	60 (1524)	36 (914)	10 (254)	30 (762)	30 (762)	5 FLG (127)	1 (25)
V410LUSG	62 (1575)	74 (1880)	66 (1676)	42 (1067)	10 (254)	30 (762)	38 (965)	6 FLG (152)	1 1/2 (38)
V510LUSG	68 (1727)	74 (1880)	72 (1829)	48 (1219)	10 (254)	31 (287)	44 (1118)	8 FLG (203)	1 1/2 (38)

* This dimension is for the longest coil available, shorter coils with a corresponding shorter "P" dimension are available. Consult factory.

** Dimension A can be changed to suit customer requirements.

CONSTANTEMP RECIRCULATION KIT

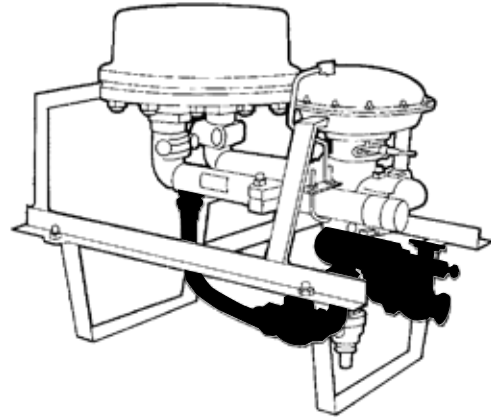
APPLICATION DATA

Long piping runs in:

- > Hospitals
- > Universities
- > Military bases
- > Industrial plants

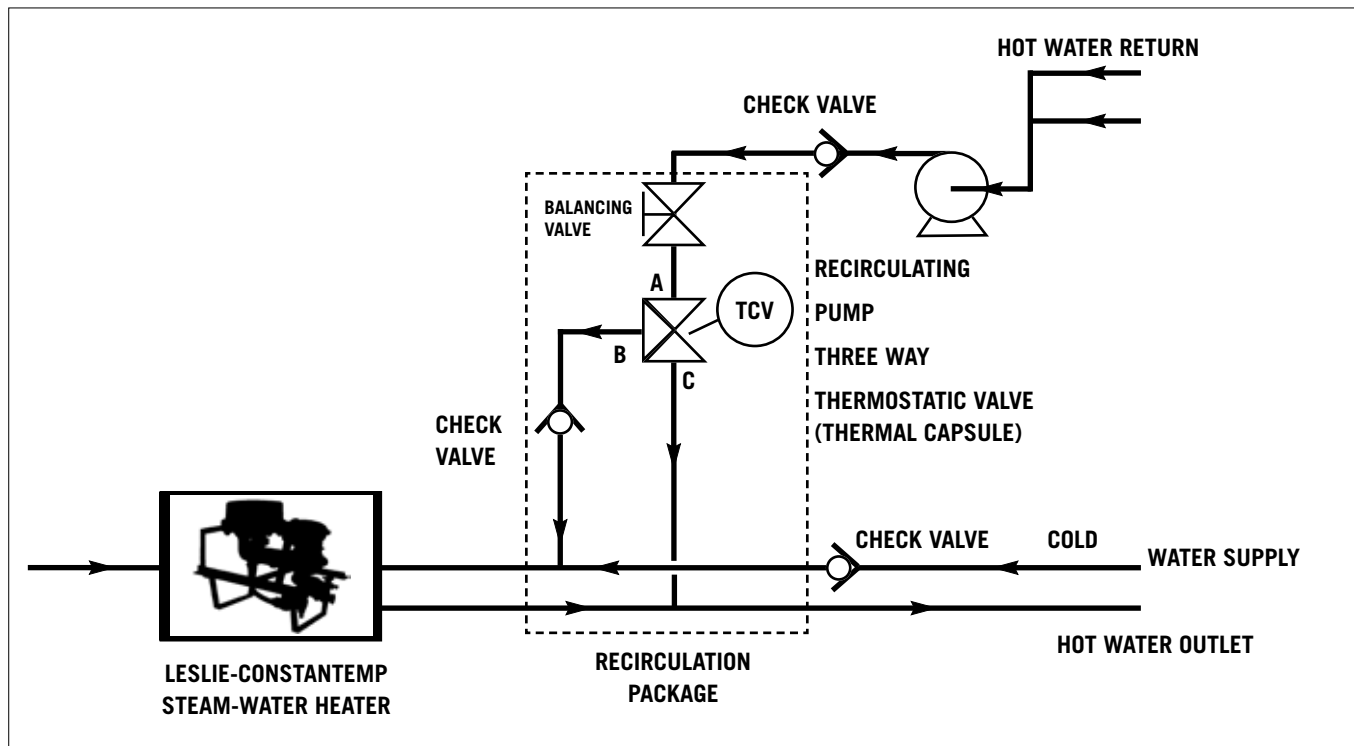
FEATURES

- > Pre-piped
- > Controls Recirculation
- > Fits entirely within heater envelope
- > Non-adjustable
- > Rugged thermostatic valve



The recirculation system is integrally mounted within the heater system. You need only to connect the return line to the recirculation connection on the heater.

Operation Schematic



INSULATED COVER

APPLICATIONS

- › Safety - prevents burns
- › Save energy
- › Use on all Constantemps

FEATURES

- › Slips on existing heaters
- › Easily removable for maintenance of heat exchanger
- › Handy ties to hold in place
- › Reduces heat loss by 90%

DESCRIPTION

Reusable insulation cover designed to fit the individual shape of each model Leslie heater. Each cover fits smoothly over the heat exchanger and ties snugly around the bottom to prevent heat loss. Cover is ruggedly designed to last through years of service.

-sizing – GENERAL

CONSTANTEMP HEATER SIZING

1. Determine inlet temperature, set point, required flow and steam pressure from the customer. If flow in GPM is not known, use the ASHRAE fixture count method in this sizing section to determine flow.
2. If steam pressure is greater than 15 PSI, use the Reducing Valve Selection Chart.
3. To determine heater size, enter the left hand side of the chart at the inlet temperature and corresponding outlet temperature (set-point).
4. Read across to your steam pressure and then read down till you see a flow equal to or greater than the system requirements.
5. Then read across to the right to the corresponding heater model number.

STEAM FLOW REQUIREMENTS

$$\frac{\#}{\text{HR}} = \frac{(\text{GPH})(T_2 - T_1)}{100}$$

CONDENSATE FLOW

$$\frac{\#}{\text{HR}} \div 500 = \text{GPM CONDENSATE}$$

CONSTANTEMP HEATER CODE SELECTION CHART

MODEL	LOW GPM	EXCHANGER MATERIAL	COIL MATERIAL	DESIGN	TUBE PRESSURE	
E	9	0	1	L	H	W
1	2	3	4	5	6	7

Model - Position 1 E - Single Wall F - Double Wall	Exchanger Material - Position 3 0 = Ductile iron, 75 psi 2 = Cast steel, 150 psi 4 = Cast steel, 150 psi, ASME 'U' Stamp 5 = Cast steel, 150 psi, ASME 'UM' Stamp	Design - Position 5 Blank - High pressure (up to 60 GPM only) L - Low pressure (all sizes)
Flow GPM* - Position 2 15 = (15 GPM) 3 = (30 GPM) 45 = (45 GPM) 6 = (60 GPM) 75 = (75 GPM) 9 = (90 GPM) 105 = (105 GPM) 12 = (120 GPM)	Coil Material - Position 4 0 = Copper 1 = Admiralty 2 = Cupro-Nickel 3 = Stainless steel	Tube Pressure - Position 6 & 7 Blank - 150 psig HW - 250 psig DW - Double Wall

*Nominal Flow GPM based on 100°F rise

EXAMPLE

Inlet	40°F
Outlet	140°F
Steam	15 PSI
Flow	65 GPM
Selection	E-7500L heater

VARIABLE PRESSURE HEATER SIZING

1. Determine inlet temperature, set point, required flow and steam pressure from the customer. If flow in GPM is not known use the ASHRAE fixture count method in this sizing section to determine flow.
2. Determine required steam valve size from steam valve selection chart.
3. To determine heater size enter the left hand side of the chart at the inlet temperature and corresponding outlet temperature (set-point).
4. Read across to your inlet steam pressure and then read down till you see a flow equal to or greater than the system requirements.
5. Then read across to the right to the corresponding heater model number.

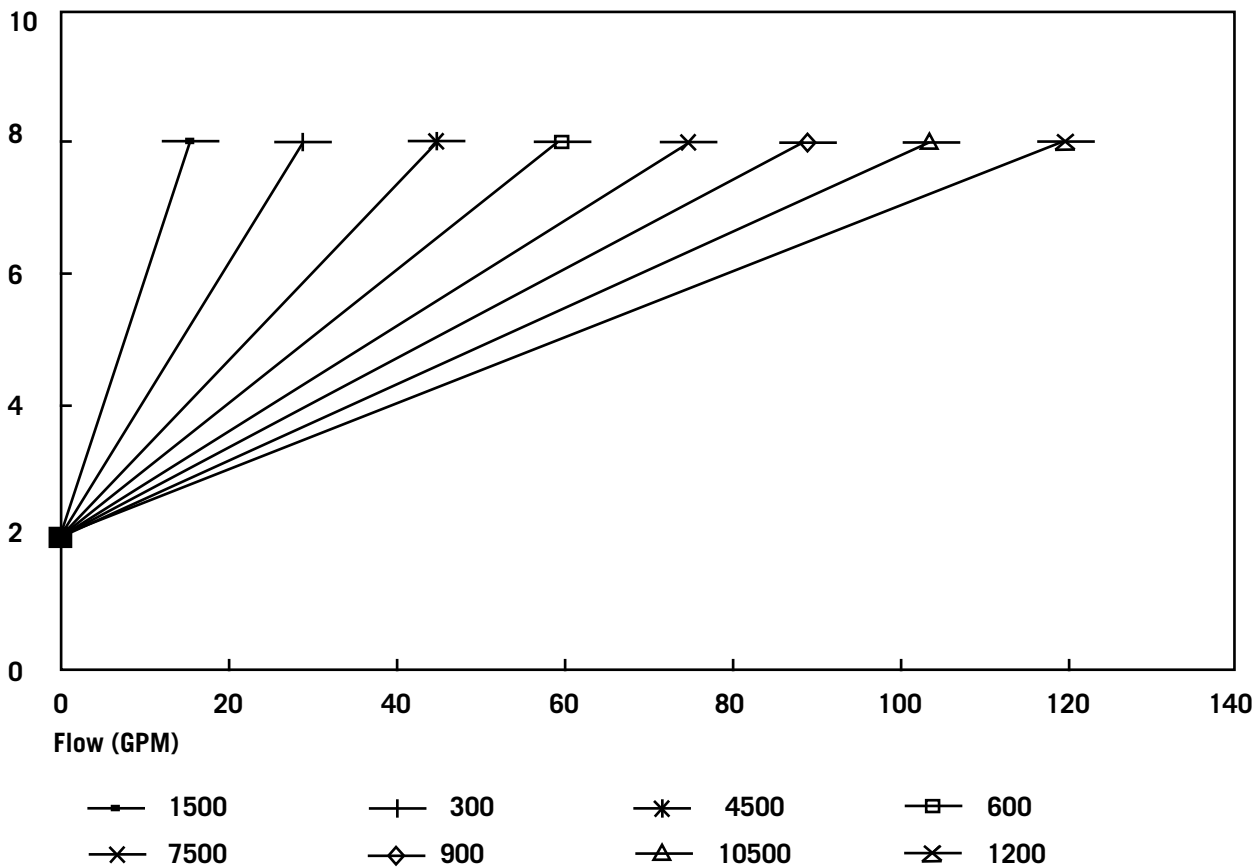
SIZING – GENERAL

PRESSURE DROP VERSUS FLOW LESLIE CONSTANTEMP HEATERS

Capacity tables for Leslie Constantemp Heaters show various capacities for each model number, depending upon the temperature rise and inlet steam pressure.

The curves shown below give the water pressure drop versus the flow in GPM for Leslie Constantemp Heaters. It is important to calculate the pressure drop for any particular application from these curves to be sure the pressure drop through our heater does not exceed the customer requirements.

Flow vs. Pressure Drop



SIZING – GENERAL

DETERMINING LESLIE-CONSTANTEMP STEAM-WATER HEATER LOAD REQUIREMENTS*

When sizing the Leslie-Constantemp heater it is necessary to determine the maximum instantaneous flow in gallons per minute (GPM). If the customer cannot provide flow in GPM, it is necessary to perform a count of all fixtures that the heater will serve.

Fixture units (Table 1) are selected for each fixture using hot water and are totalled. Maximum hot water demand in GPM is obtained from Fig. 1 or 2 by matching total fixture units to the curve for the type of building and reading GPM. Hot water for fixtures and outlets that have constant flows should be added to demand.

Unusual hot water requirements in a building should be analyzed to determine if additional capacity is required. An example is a dormitory in a military school where all showers and lavatories can be used simultaneously when students return from a parade. In such a case, the heater should be sized for the full flow of the system.

To make preliminary estimates of hot water demand when the fixture count is not known, use Table 2 with Fig. 1 or 2. The results will usually be higher than the demand determined from the actual fixture count. Actual heater size should be determined from Table 1.

Example: Determine the hot water flow rate for sizing a heater for a 600-student elementary school with the following fixture count; 60 public lavatories, 6 slop sinks, 4 kitchen sinks, 6 showers, and 1 dishwasher at 8 GPM.

Solution: For a preliminary, estimate, use Table 2 to find estimated flow. The basic flow is determined from curve D of Fig. 2, at 600 students x 0.3 fixture units per student = 180 fixture units, plus 6 showers x 1.5 fixture units = 9, or 189 fixture units, for a total flow of 23 GPM.

To size the unit based on actual fixture count and Table 1, the calculation is as follows:

60	public lavatories	x 1	F.U.	=	60 F.U.
6	service sinks	x 2.5	F.U.	=	15 F.U.
4	kitchen sinks	x 0.75	F.U.	=	3 F.U.
6	showers	x 1.5	F.U.	=	9 F.U.
Subtotal					87 F.U.

At 87 fixture units, curve D of Fig. 2 shows 16 GPM, to which must be added the dishwasher requirement of 8 GPM. Thus, the total flow is 24 GPM.

Comparing the flow based on actual fixture count to that obtained from the preliminary estimate shows the preliminary estimate to be slightly lower. It is possible that the preliminary estimate could have been as much as twice the final fixture count result. To prevent oversizing the equipment, it is imperative to use the actual fixture count method to select the unit.

TABLE 1. Hot Water Demand in Fixture Units [140° F (60° C) Water]

	APARTMENT HOUSE	HOTELS & GYMNASIUM	INDUSTRIAL HOSPITAL	DORMITORIES	PLANT	OFFICE	BUILDING	SCHOOL	YMCA
Basins, private lavatory	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Basins, public lavatory	—	1	1	1	1	1	1	1	1
Bathtubs	1.5	1.5	—	1.5	1.5	—	—	—	—
Dishwashers	1.5	Five (5) Fixture Units per 250 Seating Capacity							
Therapeutic bath	—	—	—	5	—	—	—	—	—
Kitchen sink	0.75	1.5	—	3	1.5	3	—	0.75	3
Pantry sink	—	2.5	—	2.5	2.5	—	—	2.5	2.5
Service sink	1.5	2.5	—	2.5	2.5	2.5	2.5	2.5	2.5
Showers	1.5	1.5	1.5	1.5	1.5	3.5	—	1.5	1.5
Circular wash fountain	—	2.5	2.5	2.5	—	4	—	2.5	2.5
Semicircular wash fountain	—	1.5	1.5	1.5	—	3	—	1.5	1.5

^a In applications where all showers can be used at one time the actual flow from each shower should be multiplied by the number of showers and added to flow obtained by the fixture unit method.

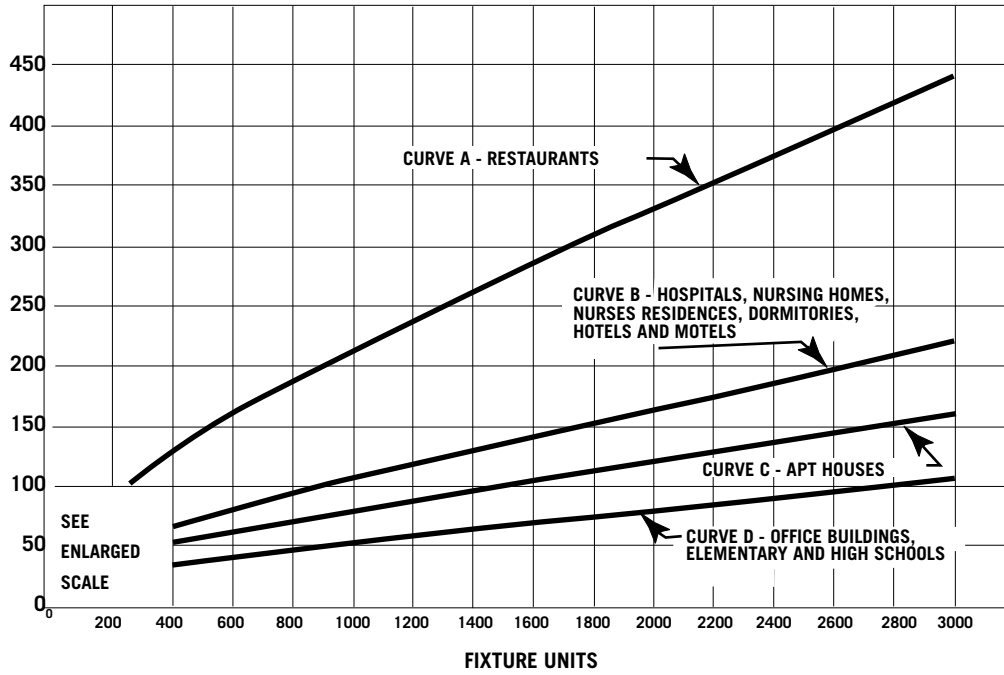
TABLE 2. Preliminary Hot Water Demand Estimate

TYPE OF BUILDING	UNIT	FIXTURE UNITS PER UNIT	TYPE OF BUILDING	UNIT	FIXTURE UNITS PER UNIT
Hospital or nursing home	Bed	2.50	Elementary school	Student	0.30 ^a
Hotel or motel	Room	2.50 0.15	Jr. and Sr. high school	Student	0.30 ^a
Office building	Person		Apartment house	Apartment	3.00

^a Plus shower load.

SIZING – GENERAL

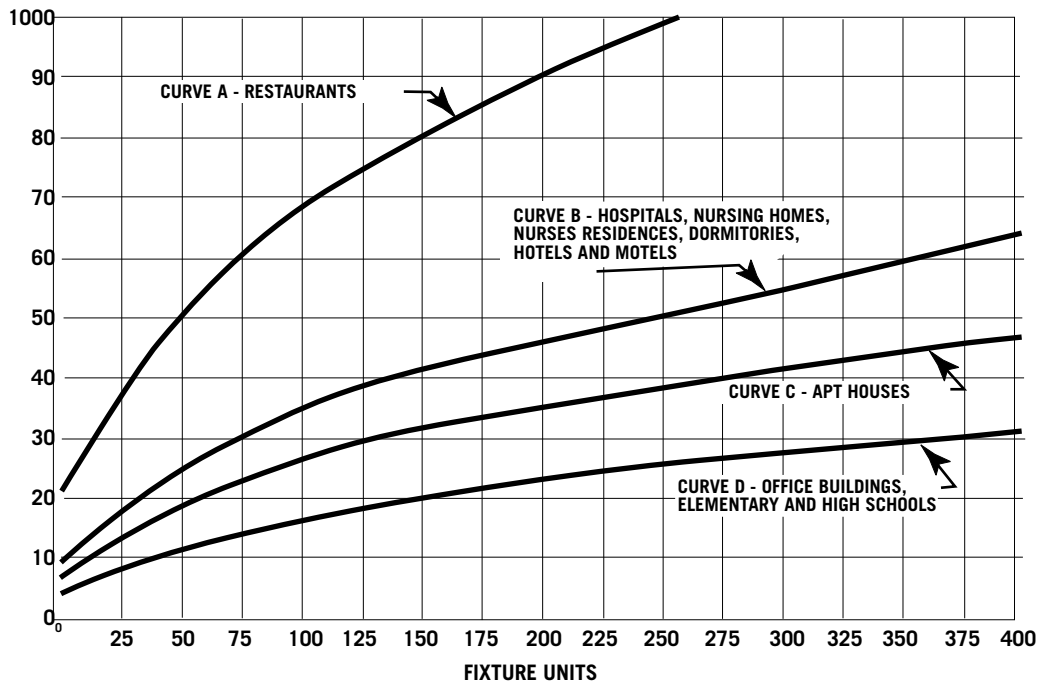
Fig. 1 Modified Hunter Curve for Hot Water Flow Rate (Corrected for Type of Building Usage)



600

2800

Fig. 2 Enlarged Section of Modified Hunter Curve for Hot Water Flow Rate (Corrected for Type of Building Usage)



* Portions of text and tables "Reprinted by permission from ASHRAE Handbook -- 1999 Systems"

CONSTANTEMP SERIES SIZING CHART (GPM)

INLET TEMP °F	SET TEMP °F	STEAM PRESSURE - PSIG				MODEL
		2	5	10	15	
40	105 To 110	15	15	15	15	1500L
		29	30	30	30	300L
		22	25	27	35	F-340LDW
		44	45	45	45	4500L
		58	60	60	60	600L
		54	60	62	65	F-640LDW
		73	75	75	75	7500L
		87	90	90	90	900L, F-940LDW
		102	105	105	105	10500L
		116	120	120	120	1200L, F-1240LDW
40	120	14	15	15	15	1500L
		27	30	30	30	300L
		22	25	27	35	F-340LDW
		41	45	45	45	4500L
		54	60	60	60	600L
		54	60	62	65	E-640LDW
		68	75	75	75	7500L
		81	90	90	90	900L, F-940LDW
		95	105	105	105	10500L
		108	120	120	120	1200L, F-1240LDW
40	140	10	11	12	14	1500L
		20	22	24	27	300L
		22	25	27	35	F-340LDW
		33	38	41	44	4500L
		46	54	58	60	600L
		54	60	62	65	F-640LDW
		58	68	73	75	7500L
		69	81	87	90	900L, F-940LDW
		81	95	102	105	10500L
		92	108	116	120	1200L, F-1240LDW
40	150	10	10	11	12	1500L
		17	19	21	23	300L
		20	21	23	25	F-340LDW
		29	34	37	39	4500L
		40	49	53	54	600L, F-640LDW
		50	61	66	68	7500L
		60	73	79	81	900L, F-940LDW
		70	86	93	95	10500L
		80	98	106	108	1200L, F-1240LDW
		40	160	—	—	—
—	—			—	—	300L
—	—			—	—	F-340LDW
26	31			33	35	4500L
34	41			44	46	600L, F-640LDW
43	51			55	58	7500L
51	61			66	69	900L, F-940LDW
60	72			77	81	10500L
68	82			88	92	1200L, F-1240LDW
40	180			—	—	—
		—	—	—	—	300L
		—	—	—	—	F-340LDW
		16	17	19	21	4500L
		21	23	25	28	600L, F-640LDW
		26	29	31	35	7500L
		31	34	37	42	900L, F-940LDW
		37	40	44	49	10500L
		42	46	50	56	1200L, F-1240LDW

INLET TEMP °F	SET TEMP °F	STEAM PRESSURE - PSIG				MODEL
		2	5	10	15	
60	105 To 110	15	15	15	15	1500L
		30	30	30	30	300L
		30	30	33	35	F-340LDW
		45	45	45	45	4500L
		60	60	60	60	600L
		60	62	63	65	F-640LDW
		75	75	75	75	7500L
		90	90	90	90	900L, F-940LDW
		105	105	105	105	10500L
		120	120	120	120	1200L, F-1240LDW
60	120	15	15	15	15	1500L
		30	30	30	30	300L
		30	30	33	35	F-340LDW
		45	45	45	45	4500L
		60	60	60	60	600L
		52	57	62	65	F-640LDW
		75	75	75	75	7500L
		90	90	90	90	900L, F-940LDW
		105	105	105	105	10500L
		120	120	120	120	1200L, F-1240LDW
60	140	12	13	14	15	1500L
		23	25	27	30	300L
		25	27	30	35	F-340LDW
		40	42	44	45	4500L
		57	59	60	60	600L
		52	57	62	65	F-640LDW
		71	74	75	75	7500L
		85	88	90	90	900L, F-940LDW
		100	103	105	105	10500L
		114	118	120	120	1200L, F-1240LDW
60	150	10	11	12	14	1500L
		20	22	24	27	300L
		23	25	27	30	F-340LDW
		35	38	41	44	4500L
		49	54	57	60	600L
		52	57	62	65	F-640LDW
		61	68	71	75	7500L
		73	81	85	90	900L, F-940LDW
		86	95	100	105	10500L
		98	108	114	120	1200L, F-1240LDW
60	160	—	—	—	—	1500L
		—	—	—	—	300L
		—	—	—	—	F-340LDW
		32	37	38	42	4500L
		42	49	51	56	600L, F-640LDW
		53	61	64	70	7500L
		63	73	76	84	900L, F-940LDW
		74	86	89	98	10500L
		84	98	102	112	1200L, F-1240LDW
		60	180	—	—	—
—	—			—	—	300L
—	—			—	—	F-340LDW
22	25			29	33	4500L
29	33			39	44	600L, F-640LDW
36	41			49	55	7500L
43	49			58	66	900L, F-940LDW
51	58			68	77	10500L
58	66			78	88	1200L, F-1240LDW

To calculate the capacity of available alternate coils, multiply the capacity from the table by the following factors: (Double wall only available in copper.)

Coil Materials (single wall only)	Capacity Factor
Admiralty	0.95
Cupro-nickel	0.81
Stainless steel	0.85

CONSTANTEMP SERIES SIZING CHART (LPM)

INLET TEMP °C	SET TEMP °C	STEAM PRESSURE - BAR				MODEL	INLET TEMP °C	SET TEMP °C	STEAM PRESSURE - BAR				MODEL
		0.1	0.3	0.7	1				0.1	0.3	0.7	1	
4.4	40 To 43	57	57	57	57	1500L	15.5	40 To 43	57	57	57	57	1500L
		110	114	114	114	300L			114	114	114	114	300L
		83	95	102	132	F-340LDW			114	114	125	132	F-340LDW
		167	170	170	170	4500L			170	170	170	170	4500L
		220	227	227	227	600L			227	227	227	227	600L
		204	227	235	246	F-640LDW			235	235	238	246	F-640LDW
		276	284	284	284	7500L			284	284	284	284	7500L
		329	341	341	341	900L, F-940LDW			341	341	341	341	900L, F-940LDW
		386	397	397	397	10500L			397	397	397	397	10500L
		439	454	454	454	1200L, F-1240LDW			454	454	454	454	1200L, F-1240LDW
		4.4	49	53	57	57			57	1500L	15.5	49	57
102	114			114	114	300L	114	114	114	114			300L
43	95			102	132	F-340LDW	114	114	125	132			F-340LDW
155	170			170	170	4500L	170	170	170	170			4500L
204	227			227	227	600L	227	227	227	227			600L
204	227			227	246	F-640LDW	227	227	235	246			F-640LDW
257	284			284	284	7500L	284	284	284	284			7500L
307	341			341	341	900L, F-940LDW	341	341	341	341			900L, F-940LDW
360	397			397	397	10500L	397	397	397	397			10500L
409	454			454	454	1200L, F-1240LDW	454	454	454	454			1200L, F-1240LDW
4.4	60			38	42	45	53	1500L	15.5	60			45
		76	83	91	102	300L	87	95			102	114	300L
		83	95	102	132	F-340LDW	95	102			114	132	F-340LDW
		125	144	155	167	4500L	151	159			167	170	4500L
		174	204	220	227	600L	216	223			227	227	600L
		204	227	235	246	F-640LDW	216	233			235	246	F-640LDW
		220	257	276	284	7500L	269	280			284	284	7500L
		261	307	329	341	900L, F-940LDW	322	333			341	341	900L, F-940LDW
		307	360	386	397	10500L	379	390			397	397	10500L
		348	409	439	454	1200L, F-1240LDW	432	447			454	454	1200L, F-1240LDW
		4.4	66	38	38	42	45	1500L			15.5	66	38
64	72			79	87	300L	76	83	91	102			300L
76	79			87	95	F-340LDW	87	95	102	114			F-340LDW
110	129			140	148	4500L	132	144	155	167			4500L
151	185			201	204	600L, F-640LDW	185	204	216	227			600L
189	231			250	257	7500L	197	216	235	246			F-640LDW
227	276			299	307	900L, F-940LDW	231	257	269	284			7500L
265	326			352	360	10500L	276	307	322	341			900L, F-940LDW
303	371			401	409	1200L, F-1240LDW	326	360	379	397			10500L
							371	409	432	454			1200L, F-1240LDW
4.4	71			—	—	—	—	1500L	15.5	71			—
		—	—	—	—	300L	—	—			—	—	300L
		—	—	—	—	F-340LDW	—	—			—	—	F-340LDW
		98	117	125	132	4500L	121	140			144	159	4500L
		129	155	167	174	600L, F-640LDW	159	185			193	212	600L, F-640LDW
		163	193	208	220	7500L	201	231			242	265	7500L
		193	231	250	261	900L, F-940LDW	238	276			288	318	900L, F-940LDW
		227	273	291	307	10500L	280	326			337	371	10500L
		257	310	333	348	1200L, F-1240LDW	318	371			386	424	1200L, F-1240LDW
		4.4	82	—	—	—	—	1500L			15.5	82	—
—	—			—	—	300L	—	—	—	—			300L
—	—			—	—	F-340LDW	—	—	—	—			F-340LDW
61	64			72	79	4500L	83	95	110	125			4500L
79	87			95	106	600L, F-640LDW	110	125	148	167			600L, F-640LDW
98	110			117	132	7500L	136	155	185	208			7500L
117	129			140	159	900L, F-940LDW	163	185	220	250			900L, F-940LDW
140	151			167	185	10500L	193	220	257	291			10500L
159	174			189	212	1200L, F-1240LDW	220	250	295	333			1200L, F-1240LDW

To calculate the capacity of available alternate coils, multiply the capacity from the table by the following factors: (Double wall only available in copper.)

Coil Materials (single wall only)

- Admiralty
- Cupro-nickel
- Stainless steel

Capacity Factor

- 0.95
- 0.81
- 0.85

SIZING – CONSTANTEMP SERIES

REDUCING VALVE SELECTION CHART (Gallon Per Minute)

INLET TEMP		SET TEMP	STEAM SUPPLY	SIZE "GPK OR GPKP" SERIES VALVE						
°F	°F	PSIG	1500L	300L 340LDW	4500L	600L 640LDW	7500L	900L 940LDW	10500L	1200L 1240LDW
40	105 To 110	20	1¼	2½	3	4	4	4	4	4*
		25	1	1½	2½	3	3	3	3	3
		50	¾	1	1¼	1½	2	2½	2½	3
		75	½	¾	1	1¼	1½	1½	2	2
40	120	100	2	¾	1	1	1¼	1¼	1½	1½
		125	2	¾	¾	1	1	1¼	1¼	1½
		150	½	½	¾	1	1	1	1¼	1¼
		175	½	½	¾	¾	1	1	1	1¼
40	140	20	1½	2½	3	4	4	4	4*	4*
		25	1¼	2	2½	3	3	3	3	3
		50	¾	1¼	1½	2	2½	2½	3	3
		75	¾	1	1¼	1½	2	2½	2½	2½
40	150	100	½	¾	1	1¼	1½	1½	2	2½
		125	½	¾	1	1¼	1¼	1½	1½	2
		150	½	¾	1	1	1¼	1¼	1½	1½
		175	½	¾	¾	1	1	1¼	1¼	1½
40	160	20	—	—	2½	4	4	4*	4*	4**
		25	—	—	3	3	3	3	3	3
		50	—	—	1½	2	2½	2½	3	3
		75	—	—	1¼	1½	1½	2	2½	2½
40	180	100	—	—	1	1¼	1½	1½	2	2
		125	—	—	1	1	1¼	1¼	1½	1½
		150	—	—	1	1	1¼	1¼	1¼	1¼
		175	—	—	¾	¾	1	1	1¼	1¼
60	105 TO 110	20	1¼	1½	2½	3	3	3	3	3
		25	1	1¼	2	2½	2½	2½	2½	2½
		50	½	¾	1	1	1¼	1¼	1½	1½
		75	½	¾	¾	1	1	1¼	1¼	1½
60	120	100	½	¾	¾	1	1	1¼	1¼	1½
		125	½	¾	¾	1	1	1¼	1¼	1½
		150	½	¾	¾	¾	¾	¾	¾	¾
		175	½	¾	¾	¾	¾	¾	¾	¾
60	140	20	1½	2½	3	4	4	4	4*	4*
		25	1¼	2	2½	3	3	3	3	3
		50	¾	1¼	1½	1½	2	2½	2½	3
		75	¾	1	1¼	1¼	1½	1½	2	2½
60	150	100	2	¾	1	1¼	1¼	1½	1½	2
		125	2	¾	1	1¼	1¼	1½	1½	2
		150	2	¾	¾	1	1	1¼	1¼	1½
		175	2	¾	¾	¾	¾	¾	¾	¾
60	160	20	—	—	4	4	4	4*	4*	4**
		25	—	—	3	3	3	3	3	3
		50	—	—	1½	2	2½	2½	3	3
		75	—	—	1¼	1½	1½	2	2½	2½
60	180	100	—	—	1	1¼	1¼	1½	1½	2
		125	—	—	1	1	1¼	1¼	1½	1½
		150	—	—	1	1	1¼	1¼	1¼	1¼
		175	—	—	¾	¾	1	1	1¼	1¼

SIZING – CONSTANTEMP SERIES

REDUCING VALVE SELECTION CHART (Liter Per Minute)

INLET TEMP	SET TEMP	STEAM SUPPLY	SIZE "GPK OR GPKP" SERIES VALVE								
			1500L	300L 340LDW	4500L	600L 640LDW	7500L	900L 940LDW	10500L	1200L 1240LDW	
°C	°C	PSIG	1500L	300L 340LDW	4500L	600L 640LDW	7500L	900L 940LDW	10500L	1200L 1240LDW	
4.4	40 TO 43	20	32	65	80	100	100	100	100	100	
		25	25	40	65	80	80	100	100	100	
		50	20	25	32	40	50	65	65	80	80
		75	15	20	25	32	40	40	50	50	50
4.4	49	100	15	20	25	25	32	32	40	40	
		125	15	20	20	25	25	32	32	40	40
		150	15	15	20	25	25	25	32	32	32
		175	15	15	20	20	25	25	25	32	32
4.4	60	20	40	65	80	100	100	100	100	100	
		25	32	50	65	80	80	100	100	100	
		50	20	32	40	40	65	65	80	80	80
		75	20	25	32	40	50	65	65	65	65
4.4	66	100	15	20	25	32	40	40	50	65	
		125	15	20	25	32	32	40	40	50	50
		150	15	20	25	25	32	32	40	40	40
		175	15	15	20	25	25	32	32	40	40
4.4	71	20	—	—	65	100	100	100	100	100	
		25	—	—	80	80	100	100	100	100	
		50	—	—	40	50	65	65	80	80	80
		75	—	—	32	40	40	50	65	65	65
4.4	82	100	—	—	25	32	40	40	50	50	
		125	—	—	25	25	32	32	40	40	40
		150	—	—	25	25	32	32	32	32	40
		175	—	—	20	25	25	32	32	32	32
4.4	43	20	32	40	65	80	100	100	100	100	
		25	25	32	40	65	80	80	100	100	
		50	15	20	25	32	40	40	50	50	50
		75	15	20	20	25	25	25	32	32	32
4.4	49	100	15	20	25	25	32	32	40	40	
		125	15	20	25	25	32	32	40	40	40
		150	15	15	20	20	25	25	32	32	32
		175	15	15	20	20	25	25	25	32	32
4.4	60	20	40	65	80	100	100	100	100	100	
		25	32	50	65	80	80	100	100	100	
		50	20	32	40	40	65	65	80	80	80
		75	20	25	32	40	50	65	65	65	65
4.4	66	100	15	20	25	32	40	40	50	65	
		125	15	20	25	32	32	40	40	50	50
		150	15	20	25	25	32	32	40	40	40
		175	15	15	20	25	25	32	32	40	40
4.4	71	20	—	—	65	100	100	100	100	100	
		25	—	—	80	80	100	100	100	100	
		50	—	—	40	50	65	65	80	80	80
		75	—	—	32	40	40	50	65	65	65
4.4	82	100	—	—	25	32	40	40	50	50	
		125	—	—	25	25	32	32	40	40	40
		150	—	—	25	25	32	32	32	32	40
		175	—	—	20	25	25	32	32	32	32
4.4	43	20	32	40	65	80	100	100	100	100	
		25	25	32	40	65	80	80	100	100	
		50	15	20	25	32	40	40	50	50	50
		75	15	20	20	25	25	25	32	32	32
4.4	49	100	15	20	25	25	32	32	40	40	
		125	15	20	25	25	32	32	40	40	40
		150	15	15	20	20	25	25	32	32	32
		175	15	15	20	20	25	25	25	32	32
4.4	60	20	40	65	80	100	100	100	100	100	
		25	32	50	65	80	80	100	100	100	
		50	20	32	40	40	65	65	80	80	80
		75	20	25	32	40	50	65	65	65	65
4.4	66	100	15	20	25	32	40	40	50	65	
		125	15	20	25	32	32	40	40	50	50
		150	15	20	25	25	32	32	40	40	40
		175	15	15	20	25	25	32	32	40	40
4.4	71	20	—	—	65	100	100	100	100	100	
		25	—	—	80	80	100	100	100	100	
		50	—	—	40	50	65	65	80	80	80
		75	—	—	32	40	40	50	65	65	65
4.4	82	100	—	—	25	32	40	40	50	50	
		125	—	—	25	25	32	32	40	40	40
		150	—	—	25	25	32	32	32	32	40
		175	—	—	20	25	25	32	32	32	32

SIZING – CONSTANTEMP VARIABLE PRESSURE SERIES

CONSTANTEMP VARIABLE PRESSURE STEAM CONTROL VALVE SELECTION TABLES

Model 1500/300 DIMENSIONS inches (mm)

STEAM SUPPLY PRESS. PSIG	STEAM VALVE SIZE
15 (1)	3 (76)
20-40 (1.4-2.8)	2½ (64)
40-50 (2.8-3.4)	2 (51)
50-75 (3.4-5.2)	1½ (38)
75-125 (5.2-8.6)	1¼ (32)
125-250 (8.6-17.2)	1 (25)

Model 4500/600 DIMENSIONS inches (mm)

STEAM SUPPLY PRESS. PSIG	STEAM VALVE SIZE
15-30 (1-2)	4 (102)
30-40 (2-2.8)	3 (76)
40-75 (2.8-5.2)	2½ (64)
75-125 (5.2-8.6)	2 (51)
125-250 (8.6-17.2)	1½ (38)

SIZING - CONSTANTEMP VARIABLE PRESSURE SERIES

CONSTANTEMP HIGH FLOW/TEMPERATURE HEATER SIZING CHART

HEATER SIZING CHART (GALLON PER MINUTE)

INLET TEMP F	SET TEMP F	STEAM PRESSURE - PSIG						MODEL
		10	15	20	25	30	35-250	
40 40	105 To 110 120	—	—	13 26	16 32	18 35	18 35	1500 300
		—	—	39 52	48 64	53 70	53 70	4500 600
		—	—	12 24	15 30	16 33	16 33	1500 300
		—	—	36 48	45 60	50 66	50 66	4500 600
40 40	140 150	—	—	11 22	14 28	15 30	15 30	1500 300
		—	—	33 44	42 56	45 60	45 60	4500 600
		—	—	10 20	13 26	14 28	14 28	1500 300
		—	—	30 40	39 52	42 56	42 56	4500 600
40 40	160 180	—	7 14	10 19	12 24	13 26	13 26	1500 300
		—	—	29 38	36 48	39 52	39 52	4500 600
		—	6 12	9 17	11 22	12 23	12 23	1500 300
		—	—	26 34	32 43	35 46	35 46	4500 600
60 60	105 To 110 120	—	—	15 29	19 37	20 40	20 40	1500 300
		—	—	44 58	56 74	61 81	61 81	4500 600
		—	—	14 28	18 35	19 38	19 38	1500 300
		—	—	43 57	54 73	58 78	58 78	4500 600
60 60	140 150	—	—	13 25	16 31	17 34	17 34	1500 300
		—	—	38 50	47 62	51 68	51 68	4500 600
		—	—	12 23	15 29	16 32	16 32	1500 300
		—	—	35 46	44 58	48 64	48 64	4500 600
60 60	160 180	—	8 16	11 22	14 28	15 30	15 30	1500 300
		—	—	33 44	42 56	45 60	45 60	4500 600
		—	7 14	10 19	12 24	13 26	13 26	1500 300
		—	—	29 38	36 48	39 52	39 52	4500 600

HEATER SIZING CHART (LITERS PER MINUTE)

INLET TEMP C	SET TEMP C	STEAM PRESSURE - PSIG						MODEL
		.7	1	1.4	1.7	2	2.4-17	
4.4 4.4	40 To 43 49	—	—	49 98	61 121	68 132	68 132	1500 300
		—	—	148 197	182 242	201 265	201 265	4500 600
		—	—	45 91	57 114	61 125	61 125	1500 300
		—	—	136 182	170 227	189 250	189 250	4500 600
4.4 4.4	60 60	—	—	42 83	53 106	57 114	57 114	1500 300
		—	—	125 167	159 212	170 227	170 227	4500 600
		—	—	38 76	49 98	53 106	53 106	1500 300
		—	—	114 151	148 197	159 212	159 212	4500 600
4.4 4.4	71 82	—	26 53	38 72	45 91	49 98	49 98	1500 300
		—	—	110 144	136 182	148 197	148 197	4500 600
		—	23 45	34 64	42 83	45 87	45 87	1500 300
		—	—	98 129	121 163	132 174	132 174	4500 600
15.5 15.5	40 To 43 49	—	—	57 110	72 140	76 151	76 151	1500 300
		—	—	167 220	212 280	231 307	231 307	4500 600
		—	—	53 106	68 132	72 144	72 144	1500 300
		—	—	163 216	204 276	220 295	220 295	4500 600
15.5 15.5	60 66	—	—	49 95	61 117	64 129	64 129	1500 300
		—	—	144 189	178 235	193 257	193 257	4500 600
		—	—	45 87	57 110	61 121	61 121	1500 300
		—	—	132 174	167 220	182 242	182 242	4500 600
15.5 15.5	71 82	8 16	30 61	42 83	53 106	57 114	57 114	1500 300
		—	—	125 167	159 212	170 227	170 227	4500 600
		7 14	26 53	38 72	45 91	49 98	49 98	1500 300
		—	—	110 144	136 182	148 197	148 197	4500 600

* 'R' on class designates low pressure heater requiring a reducing valve to reduce pressure to 15 PSIG. To calculate the capacity of available alternate coils, multiply the capacity from the table by the following factors:

Coil Materials	Capacity Factor
Admiralty	0.95
Cupro-nickel	0.81
Stainless steel	0.85

SIZING - CONSTANTEMP SERIES

MAXIMUM STEAM SUPPLY TEMPERATURE FOR CONSTANTEMP HEATERS

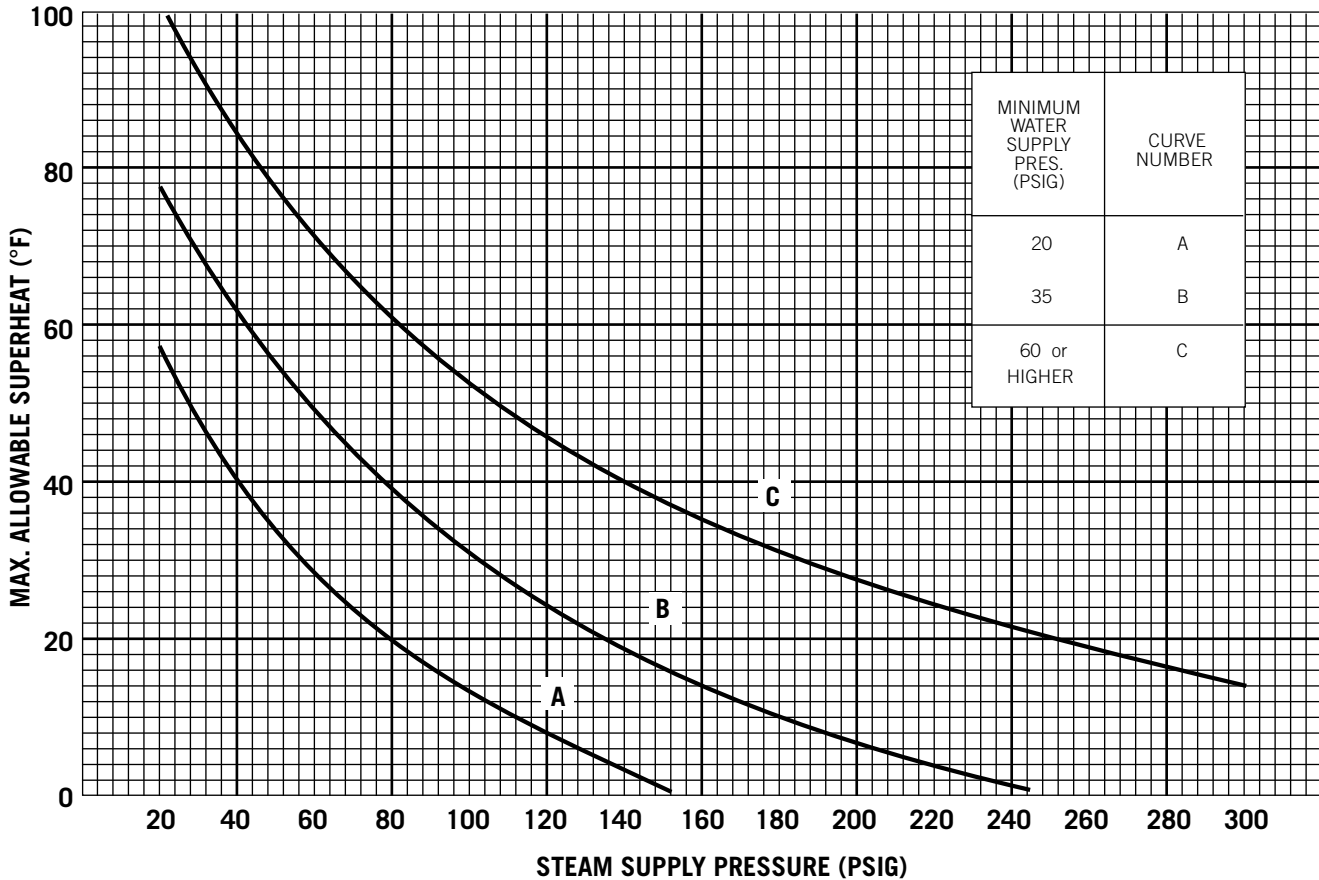
The steam supply temperature for Constantemp Heaters must be limited in order to prevent boiling or flashing of the water in the coil during no-load conditions.

- A)** Heaters With Reducing Valves In The Steam Supply
For all E-1500, E-300, E-4500, E-600 heaters, and low pressure heaters with a steam reducing valve, the maximum allowable superheat can be determined from the chart below.
- B)** Low Pressure Heaters Without Reducing Valves
For low pressure heaters without reducing valves, the maximum steam temperatures are:

MINIMUM WATER SUPPLY PRESSURE (PSIG)	MAXIMUM STEAM SUPPLY (TEMP. °F)*
20	310
35	330
60 or higher	355

* Based on 2 - 15 PSIG Steam

MAXIMUM ALLOWABLE SUPERHEAT FOR CONSTANTEMP HEATERS WITH REDUCING VALVES ON THE STEAM SUPPLY



SIZING – CONSTANTCOIL™ HEAT EXCHANGER

The following table indicates the heater models, maximum operating pressures on the tube side and shell side, number and size of tubes and the Heat Exchanger surface:

MODEL	MAX. COIL PRESS.	MAX. SHELL PRESS.	NO. TUBES & SIZE	HEAT TRANSFER AREA FT. 2
E-300 E-300L Etc.	150 PSIG	75 PSI C.I. 150 PSI Steel	Nine 1/2" O.D.	9.0
E-600 E-600L Etc.	150 PSIG	75 PSI C.I. 150 PSI Steel	Fifteen 1/2" O.D.	20.9
E-900L Etc.	150 PSIG	75 PSI C.I. 150 PSI Steel	Thirty 1/2" O.D.	41.7
E-1200L Etc.	150 PSIG	75 PSI C.I. 150 PSI Steel	Twenty Four 5/8" O.D.	48.0

SIZING – LES PACKAGED WATER HEATER

LES HEATER SIZING

1. Determine inlet temperature, set point, required flow and steam pressure from the customer. If flow in GPM is not known use the ASHRAE fixture count method in this sizing section to determine flow.
2. Read across top of chart to column matching customers steam pressure. Read down to section of chart that matches customers inlet and outlet temperatures.
3. Read down until you see a flow equal to or greater than the system requirements.
4. Then read across to the left to the corresponding heater model number.
5. Calculate the steam consumption using the formula $\#/HR = (GPH \times \text{Temp Rise}) / 100$.
6. Read across steam control valve selection chart till you match the customers inlet steam pressure then read down until you find a valve with equal to or greater than the steam flow requirement.
7. Read to the left to find corresponding control valve model size and code.

8. To size the steam trap enter appropriate trap for incoming steam pressure and determine trap size based on condensate requirement. (Note steam flow in $\#/HR$ equals condensate flow in $\#/HR$.)

EXAMPLE

Inlet	40°F
Outlet	140°F
Steam	75 PSI
Flow	65 GPM

From table heater size is V8LES830

Calculate steam requirement:

$$\begin{aligned} \#/HR &= (GPH \times \text{Temp Rise}) / 100 \\ &= (60 \times 65 \times 100) / 100 \\ &= 3,900 \end{aligned}$$

Select steam valve from table Use 2" DDLO

Select steam trap Use 2" FTB-175

STEAM VALVE SIZING

MAXIMUM FLOW RATE IN POUNDS PER HOUR OF STEAM									
MODEL/CODE	SIZE INCHES (MM)	INLET STEAM PRESSURE PSIG/(BAR)							
		5 (0.3)	10 (0.7)	15 (1)	20 (1.4)	40 (2.8)	60 (4)	80 (5.5)	100 (6.9)
DDLO U851A1B1DFO	1/2 (12)	88 (40)	126 (57)	171 (78)	206 (94)	265 (120)	314 (143)	356 (162)	394 (179)
DDLO U851B1B1GFO	3/4 (19)	199 (90)	284 (129)	385 (175)	463 (210)	597 (271)	706 (321)	801 (364)	885 (402)
DDLO U851C1B1JFO	1 (25)	332 (150)	473 (215)	642 (292)	772 (351)	996 (453)	1177 (535)	1335 (607)	1476 (671)
DDLO U851E1F1LFO	1 1/2 (38)	664 (302)	945 (430)	1285 (584)	1543 (701)	1992 (905)	2355 (1070)	2670 (1214)	2952 (1342)
DDLO U851F1H1MFO	2 (50)	1260 (573)	1796 (816)	2441 (1110)	2932 (1333)	3785 (1720)	4474 (2034)	5073 (2306)	5608 (2549)
DDBOY U841G1H1SJO	2 1/2 (64)	1990 (905)	2835 (1289)	3855 (1752)	4630 (2100)	5976 (2716)	7065 (3211)	8010 (3641)	8856 (4025)
DDBOY U841H2H1SJO	3 (76)	2765 (1257)	3938 (1790)	5354 (2434)	6430 (2923)	8300 (3773)	9812 (4460)	11125 (5057)	12300 (5591)
DDBOY U841J2N1SJO	4 (102)	4535 (2061)	6458 (2935)	8780 (3991)	10545 (4793)	13612 (6187)	16092 (7315)	18245 (8293)	20172 (9169)

TRAP SIZING

15 PSI (BAR) STEAM TO VALVE BASED UPON 1/2 PSI DIFFERENTIAL			30 PSI (BAR) STEAM TO VALVE BASED UPON 1 PSI DIFFERENTIAL			75 PSI (BAR) STEAM TO VALVE BASED UPON 5 PSI DIFFERENTIAL			125 PSI (BAR) STEAM TO VALVE BASED UPON 10 PSI DIFFERENTIAL		
Series	Size	#/Hr. Steam	Series	Size	#/Hr. Steam	Series	Size	#/Hr. Steam	Series	Size	#/Hr. Steam
FT-015H	3/4 (19)	500 (227)	FT-030H	3/4 (19)	630 (286)	FT-075H	3/4 (19)	520 (236)	FT-125H	3/4 (19)	410 (186)
FT-015H	1 (25)	500 (227)	FT-030H	1 (25)	630 (286)	FT-075H	1 (25)	520 (236)	FT-125H	1 (25)	410 (186)
FT-015H	1 1/4 (32)	770 (350)	FT-030H	1 1/4 (32)	740 (336)	FT-075H	1 1/4 (32)	2200 (1000)	FT-125C	1 1/4 (32)	1800 (818)
FT-015C	1 1/2 (38)	1700 (773)	FT-030C	1 1/2 (38)	1700 (773)	FT-075C	1 1/2 (38)	2200 (1000)	FT-125C	1 1/2 (38)	1800 (818)
FT-015H	2 (50)	3150 (1432)	FT-030C	2 (50)	3100 (1409)	FT-075C	2 (50)	2950 (1340)	FT-125C	2 (50)	2600 (1182)
FT-015X	2 (50)	8000 (3636)	FT-030X	2 (50)	6400 (2909)	FT-075X	2 (50)	7600 (3455)	FT-125X	2 (50)	6600 (3000)
FT-015C	2 1/2 (64)	20000 (9090)	FT-030C	2 1/2 (64)	20900 (9500)	FT-075C	2 1/2 (64)	19600 (8909)	FT-175	2 1/2 (64)	17100 (7773)

SIZING – LES PACKAGED WATER HEATER

RECOVERY CAPACITY – STEAM SINGLE WALL COILS

The listing below is for those steam pressures and temperature rises which are most widely used. Coils are available for other steam pressures and/or different temperature rises. Consult factory for further information.

MODEL NO.	STEAM PRESSURE PSIG AND(BAR)							
	2 (0.1)	5 (0.3)	10 (0.7)	15 (1)	25 (0.7)	50 (0.5)	75 (5.2)	100 (7)
RECOVERY GPM(LPM) / 40-120°F (4-49°C)								
*6LES624SW	22 (83)	23 (87)	25 (95)	28 (106)	31 (117)	38 (144)	43 (163)	47 (178)
*8LES830SW	60 (227)	65 (246)	71 (269)	77 (291)	86 (326)	92 (348)	92 (348)	92 (348)
*10LES1030SW	91 (344)	91 (344)	112 (424)	116 (439)	116 (439)	116 (439)	116 (439)	116 (439)
*10LES1036SW	114 (432)	116 (439)	116 (439)	116 (439)	116 (439)	116 (439)	116 (439)	11 (439)
*12LES1236SW	169 (640)	169 (640)	175 (662)	180 (681)	208 (787)	208 (787)	208 (787)	208 (787)
*12LES1242SW	207 (784)	207 (784)	208 (784)	208 (784)	208 (784)	208 (784)	208 (784)	208 (784)
*14LES1442SW	212 (803)	212 (803)	212 (803)	212 (803)	212 (803)	212 (803)	212 (803)	212 (803)
RECOVERY GPM(LPM) / 40-140°F (4-60°C)								
*6LES624SW	14 (53)	15 (57)	17 (64)	18 (68)	21 (79)	27 (102)	31 (117)	34 (129)
*8LES830SW	40 (151)	44 (167)	49 (185)	53 (201)	61 (231)	74 (280)	85 (322)	92 (348)
*10LES1030SW	60 (227)	66 (250)	77 (291)	84 (318)	95 (360)	116 (439)	116 (439)	116 (439)
*10LES1036SW	77 (291)	87 (329)	98 (371)	106 (401)	116 (439)	116 (439)	116 (439)	116 (439)
*12LES1236SW	113 (428)	113 (428)	118 (447)	140 (530)	177 (670)	209 (791)	209 (791)	209 (791)
*12LES1242SW	140 (530)	140 (530)	162 (613)	181 (685)	209 (791)	209 (791)	209 (791)	209 (791)
*14LES1442SW	199 (753)	210 (795)	213 (806)	213 (806)	213 (806)	213 (806)	213 (806)	213 (806)
RECOVERY GPM(LPM) / 40-180°F (4-82°C)								
*6LES624SW	5 (19)	6 (23)	7 (26)	9 (34)	11 (42)	14 (53)	17 (64)	19 (72)
*8LES830SW	18 (68)	20 (76)	24 (91)	27 (102)	32 (121)	42 (159)	49 (185)	55 (208)
*10LES1030SW	28 (106)	33 (125)	38 (144)	43 (163)	51 (193)	67 (254)	78 (296)	87 (329)
*10LES1036SW	36 (136)	42 (159)	49 (185)	55 (208)	65 (246)	84 (318)	98 (371)	109 (412)
*12LES1236SW	49 (185)	49 (185)	72 (272)	81 (307)	96 (363)	124 (469)	145 (549)	162 (613)
*12LES1242SW	62 (235)	70 (265)	87 (329)	101 (382)	119 (450)	153 (579)	178 (674)	198 (750)
*14LES1442SW	94 (356)	104 (394)	120 (454)	134 (507)	158 (598)	202 (765)	215 (814)	215 (814)

RECOVERY CAPACITY - BOILER WATER

Recovery Capacity Boiler Water For selection using boiler water or high temperature hot water as the energy source, consult factory or your local Leslie representative.

* Add "V" (for vertical) or "H" (for horizontal) to model number.

SIZING – LES PACKAGED WATER HEATER

RECOVERY CAPACITY STEAM Double Wall Coils

Leslie Water Heaters are available with double wall coils. Double wall coils have inner and outer tubes with a vented leak path. If either the inner or outer tube fails there can be no cross contamination of potable water and a visible indication of the leak will show. Some building codes require vented double wall coils to guard against cross contamination of potable water.

MODEL NO.	STEAM PRESSURE PSIG AND (BAR)							
	2 (0.1)	5 (0.3)	10 (0.7)	15 (1)	25 (1.7)	50 (3.5)	75 (5.2)	100 (7)
RECOVERY GPM (LPM) / 40 - 120°F (4-49°C)								
*6LES624DW	11 (42)	12 (45)	13 (49)	14 (53)	16 (61)	20 (76)	23 (87)	25 (95)
*8LES830DW	32 (121)	34 (129)	37 (140)	40 (151)	45 (170)	55 (208)	62 (235)	68 (257)
*10LES1030DW	49 (185)	54 (204)	59 (223)	64 (246)	71 (269)	88 (333)	97 (367)	104 (394)
*10LES1036DW	64 (242)	70 (265)	77 (291)	83 (314)	93 (352)	104 (394)	104 (394)	104 (394)
*12LES1236DW	93 (352)	93 (352)	115 (435)	124 (469)	139 (526)	168 (636)	186 (704)	186 (704)
*12LES1242DW	116 (439)	123 (466)	140 (530)	153 (579)	171 (647)	186 (704)	186 (704)	186 (704)
*14LES1442DW	154 (583)	162 (613)	178 (674)	191 (723)	203 (768)	203 (768)	203 (768)	203 (768)
RECOVERY GPM (LPM) / 40 - 140°F (4-60°C)								
*6LES624DW	7 (26)	7 (26)	8 (30)	9 (34)	11 (42)	14 (53)	16 (61)	18 (68)
*8LES830DW	21 (79)	22 (83)	25 (95)	27 (102)	31 (117)	39 (148)	44 (167)	49 (185)
*10LES1030DW	33 (125)	36 (136)	40 (151)	45 (170)	50 (189)	62 (235)	70 (265)	77 (291)
*10LES1036DW	44 (167)	47 (178)	53 (201)	58 (220)	65 (246)	80 (303)	91 (344)	100 (379)
*12LES1236DW	61 (231)	67 (254)	79 (299)	86 (326)	98 (371)	120 (454)	137 (519)	151 (572)
*12LES1242DW	77 (291)	86 (326)	99 (375)	107 (405)	121 (458)	148 (560)	169 (640)	185 (700)
*14LES1442DW	104 (394)	111 (420)	123 (466)	134 (509)	151 (572)	185 (700)	205 (776)	204 (772)
RECOVERY GPM (LPM) / 40 - 180°F (4-82°C)								
*6LES624DW	2 (8)	3 (11)	3 (11)	4 (15)	5 (19)	7 (27)	9 (34)	10 (38)
*8LES830DW	8 (30)	10 (38)	12 (45)	13 (49)	16 (61)	21 (79)	25 (95)	29 (110)
*10LES1030DW	14 (53)	16 (61)	19 (72)	22 (83)	26 (98)	34 (129)	41 (155)	46 (174)
*10LES1036DW	20 (76)	22 (83)	26 (98)	29 (110)	35 (132)	45 (170)	53 (201)	60 (227)
*12LES1236DW	28 (106)	32 (121)	38 (144)	43 (163)	52 (197)	68 (257)	80 (303)	90 (341)
*12LES1242DW	35 (132)	41 (155)	49 (185)	55 (208)	65 (246)	85 (322)	99 (375)	111 (420)
*14LES1442DW	47 (178)	52 (197)	61 (231)	69 (261)	82 (310)	106 (401)	124 (469)	138 (522)

* Add "V" (for vertical) or "H" (for horizontal) to model number.

CLEAN IN PLACE ACID CLEANING KIT

APPLICATION DATA

- › Clean scaled coils when fouled
- › Set up preventive maintenance program

FEATURES

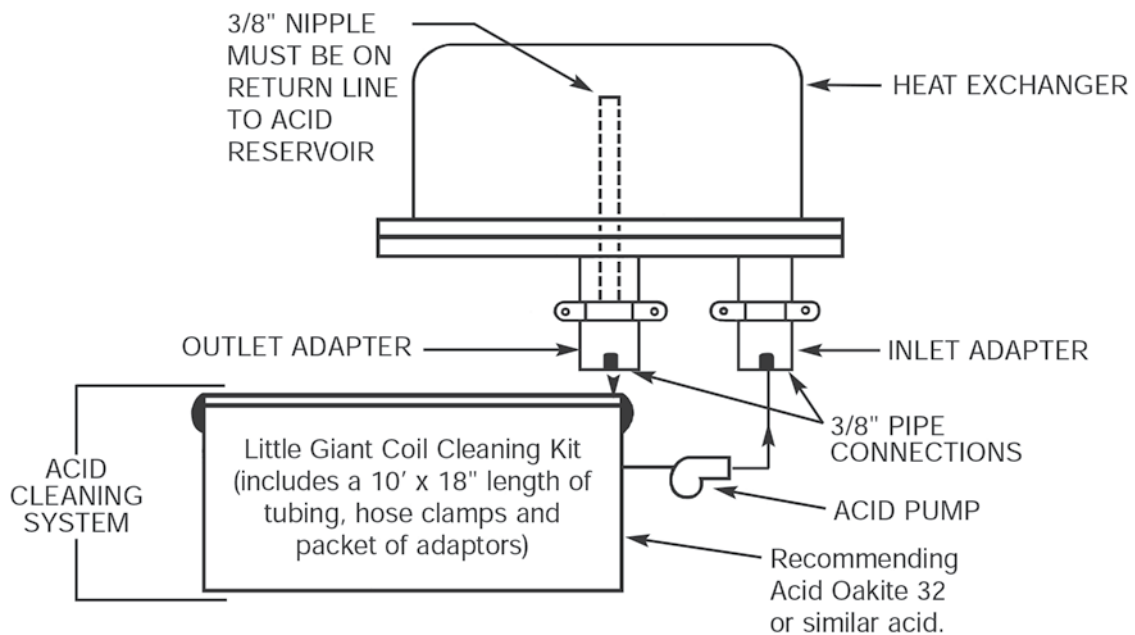
- › Clean in place
- › Everything included except the acid
- › One size fits all (only adaptors are different)
- › In stock for immediate shipment

DESCRIPTION

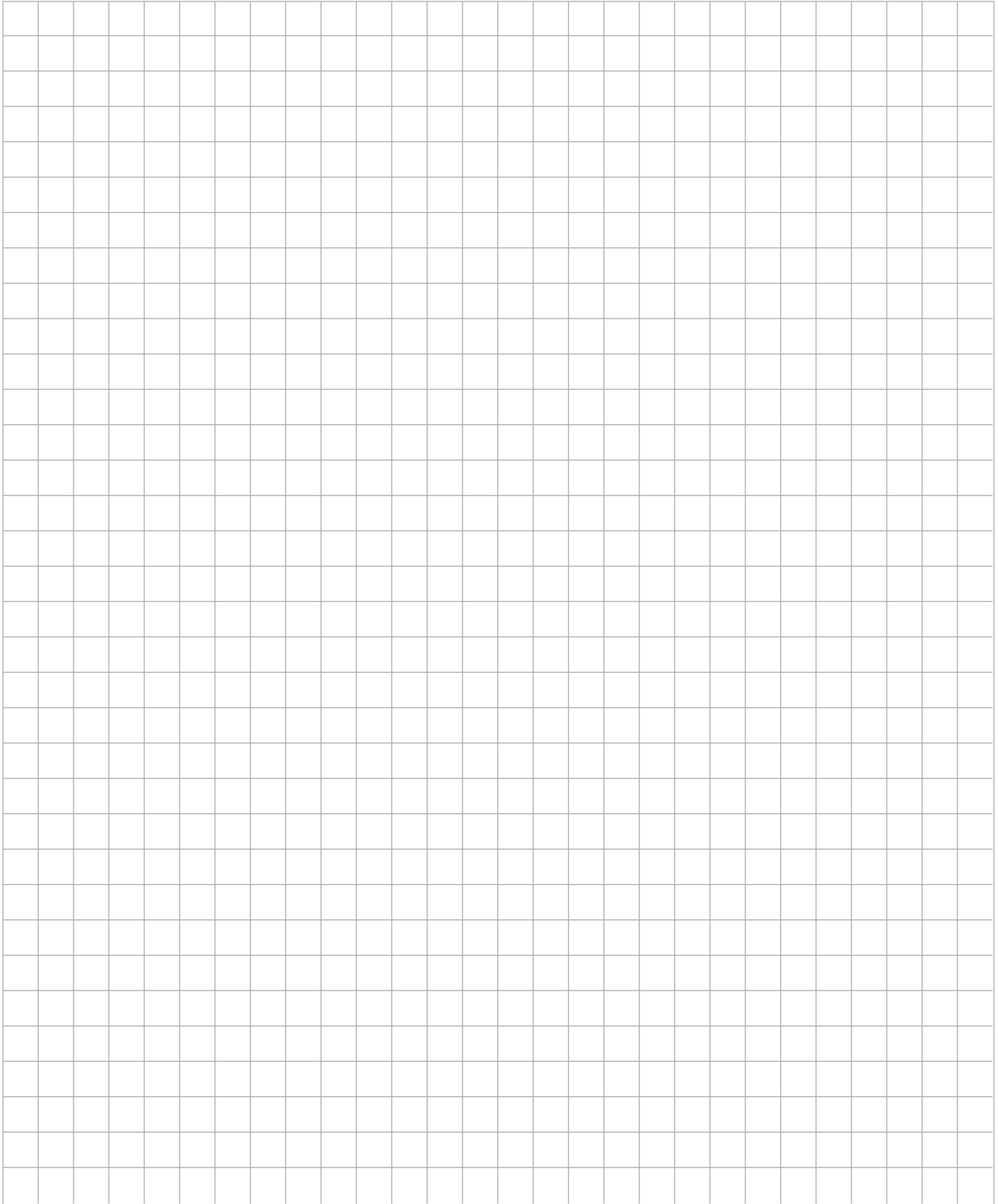
The Acid Cleaning kit consists of a 5 gallon tank, acid pump, tubing and fittings and a set of adaptors for 1 size Constantemp heat exchanger. To clean other size heaters you simply order the adaptors for the appropriate size exchanger. All parts are re-usable.

The kit does not include acid, Leslie recommends Oakite 32, RYDLYME or similar acids suitable for use with copper.

To clean the exchanger you simply remove the inlet and outlet water manifolds, there is no need to remove the exchanger or coil. When the coil is clean you flush the coil with fresh water and re-install the manifolds.



NOTES:



FABRICATION, SERVICE & REPAIR COMMITMENT TO EXCELLENCE



REMANUFACTURING, TESTING, PREVENTATIVE MAINTENANCE, CUSTOMER TRAINING AND FABRICATION

CIRCOR International operates three service centers (New Jersey, Virginia and Florida) where valves of many major manufacturers are returned to original factory specifications and given a new service warranty at a fraction of the original purchase cost. We also have an international network of Leslie licensed and trained “Red Seal” Service Centers capable of performing the same quality of work as our service centers.

CIRCOR Service Centers are also authorized to service valves manufactured by K&M, R.G. Laurence, CPC-Cryolab, Spence Engineering, Nicholson, KF, Circle Seal, SSI Equipment, Hoke, Aerodyne Controls, SKVC, Watts ACV, Go Regulator, Pibiviesse, Telford, Chas. M. Bailey, and Contromatic.

In addition to handling factory repairs, each Service Center has available factory trained Field Service Technicians to provide on-site repairs and preventative maintenance where removal is impractical or extended shutdown is unacceptable. CIRCOR Service Centers also provide custom tailored, in-depth, hands-on

training programs in operation, instrumentation and maintenance of all supported equipment. Training is conducted at one of our specially designed, fully equipped repair facilities or at your location using your own equipment.

Another service provided at the CIRCOR Service Centers is panel board fabrication. Whenever it is not practical to assemble components on-site, our experts can design, build, and ship or deliver and install a unit customized to suit your needs.

Service is a fundamental part of the Leslie operating philosophy and we urge you to request additional documentation and descriptive material.

Since Leslie Controls was founded in 1900, we have been an industry leader in quality fluid control equipment. We have developed a full line of engineered products to suit your requirements, including diaphragm control valves, control instrumentation, pressure and temperature regulators and steam water heaters.

* Assessed and certified by ABS Quality Evaluations, Inc., Houston, Texas



12501 Telecom Drive, Tampa, Florida 33637-0906
Phone +1 (813) 978-1000 | Fax +1 (813) 978-0984

www.circor.com