COMPACT® WATER HEATER

Bulletin

SEMI-INSTANTANEOUS

COMPACT® WATER HEATER

Contents

PATTERSON-KELLEY'S FULLY PACKAGED HEATER

In the late 1950s, Patterson-Kelley developed the first line of completely packaged commercial-industrial water heaters. The P-K COMPACT semi-instantaneous water heater was part of that new concept when it was introduced back then. Over the years, improvements to the heater's design have represented a continuing evolution of the original concept. The P-K COMPACT has always been completely assembled at our facility and, since it requires only four piping connections, is shipped ready for easy installation.

HISTORY OF PERFORMANCE

P-K COMPACT water heaters have performed reliably, providing long, trouble-free operation in thousands of installations in all types of commercial, institutional and industrial buildings as well as on Navy ships. Its present design, which focuses on a small heater that produces high hot water output at a closely controlled temperature, makes it the ideal water heater for any building owner.

HIGH-OUTPUT HEATER

Operating on steam, boiler water or high-temperature water, the P-K COMPACT produces up to 250 gpm at 40°F to 140°F. Though the largest unit has a footprint of only 8 sq. ft., the heater can handle any building's water heating requirements, either singly or via multiple-unit installation.

PRECISE TEMPERATURE CONTROL

The heater features P-K's unique Anticipator® control, which continuously meters heating medium demand to exact proportions of hot water requirements and regulates the hot water outlet temperature to a close tolerance of ±4°F of set point, even with sudden fluctuating draws.

PREVENTS SCALE

Constantly pumped circulation prevents scale formation and accumulation of foreign matter on the heating surfaces in most water conditions (water softening may be required with extremely hard water). The constant circulation also continually monitors water temperature, stabilizing temperature control at all draw rates.

CONSTRUCTED FOR LONG SERVICE LIFE

The P-K COMPACT is built to last. Potable water in the shell contacts only nonferrous materials, preventing rusty water. The shell is constructed of solid 90-10 copper nickel, the premium corrosion-resistant material for potable water service. Standard heat exchanger construction is copper tubing, which will handle most water conditions. Copper nickel is available for unusual water conditions.

TEMPERATURE-LIMIT SYSTEM

The P-K COMPACT water heater is protected by a double solenoid temperature-limit system with a hot water dump valve. Should any overheating of water occur, the temperature-limit system immediately kicks in to shut off the heat source and dump overheated water into the drain. The valve controlling the heat source shuts off until normal hot water temperature is restored; the unit then assumes normal operating conditions. Optional alarm and/or dry contact relay is available for remote service.

NO OVERHEAD CLEARANCE

The P-K COMPACT is the easiest to service of the semi-instantaneous water heaters on the market today. The shell always remains in place, so no overhead clearance is required for service. The tubesheets have drilled and tapped bolt holes for independent bolting, enabling the bonnet to be removed without breaking the domestic water gaskets. If a tube were to leak, it could easily be plugged off as a temporary fix and the unit put back into service within an hour. The steam or water chamber is easily removed without disturbing the piping to the unit, and there is ready access to the tube bundle.

DOUBLE WALL DESIGN

The P-K COMPACT is also available with a vented double-wall tube bundle with double tubesheets. This design offers the ultimate protection against cross-contamination of potable water and meets both health department and building codes. The P-K double-wall tube design creates maximum contact between inner and outer tubes to produce effective heat transfer, while providing a vented leak path as a visual means to indicate tube failure. The double-wall heat exchanger can be installed in any existing P-K COMPACT water heater originally supplied with single-wall tubing. Contact the factory or your local P-K representative to obtain further information, including the new rating.

A.S.M.E. CONSTRUCTION

The P-K COMPACT water heater is constructed in accordance with A.S.M.E. Code, Section VIII, Div. 1, and comes with an insurance company certificate of inspection and test.

THE P-K GUARANTEE

Patterson-Kelley guarantees that each P-K COMPACT water heater will perform at the rated capacity. P-K COMPACT capacity tables are based on data developed by Heat Transfer and Fluid Flow Service of Atomic Energy of Canada, Ltd. The water heater's capacities have been verified by Chalk River Nuclear Laboratories, Chalk River, Ontario, using an actual production unit. This is your assurance of the water heater's performance.

We also guarantee that all materials, components and workmanship in the construction of each heater are of the highest quality. If any part should prove defective within one year after start-up, a new part will be supplied without charge, provided the water heater is started within six months from the date of shipment.

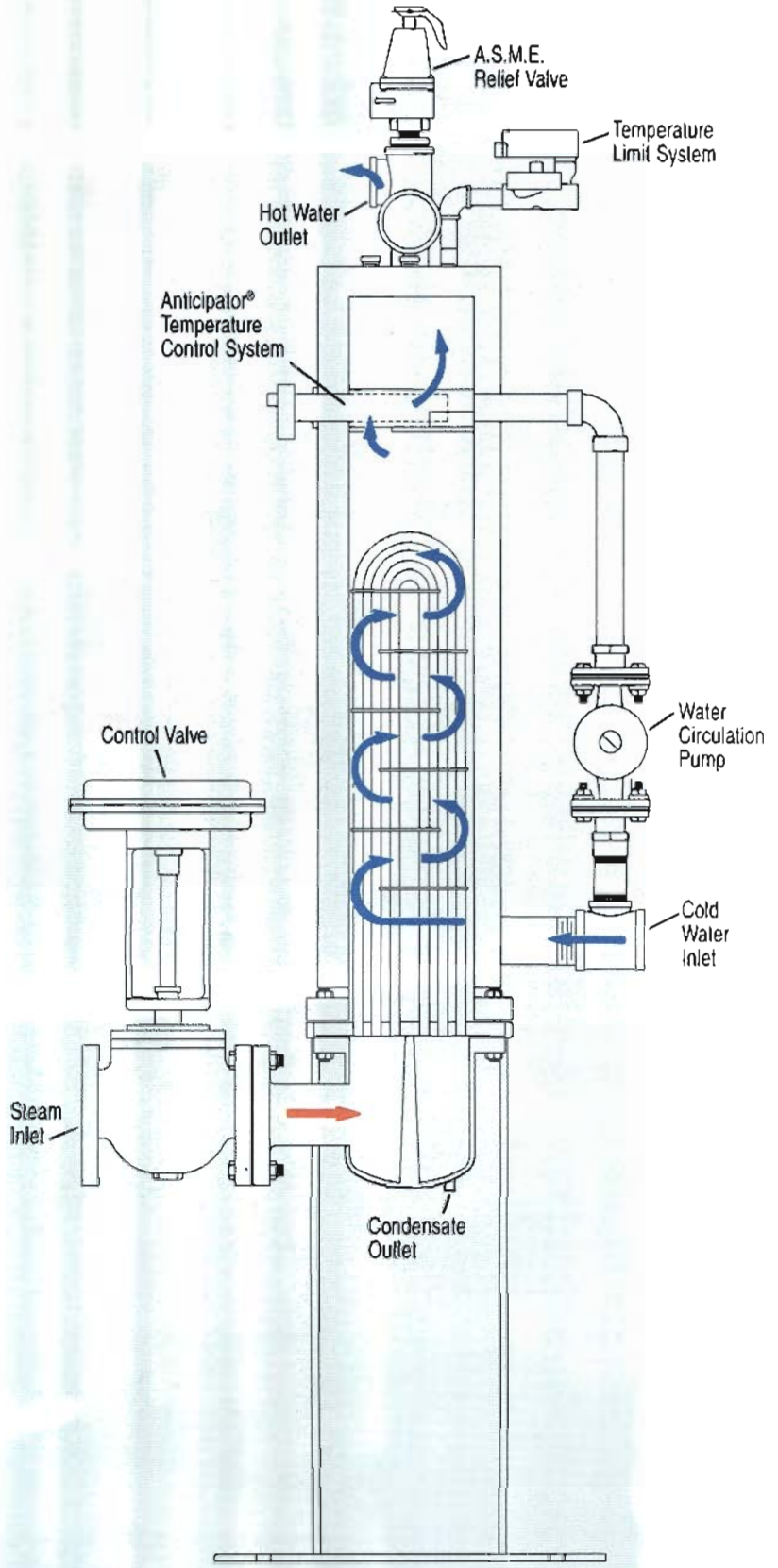
THE EXTENDED, NON-PRORATED GUARANTEES

The following components carry an extended, unconditional, non-prorated guarantee, included in the submittal:

Tube Bundle
10-year guarantee against failure caused by thermal shock, mechanical failure or erosion

Pressure Vessel
20-year guarantee against leakage

Anticipator® Temperature Control
20-year guarantee against any failure



ANTICIPATOR® CONTROL SYSTEM PRODUCES CLOSE TEMPERATURE CONTROL

The P-K COMPACT features the Anticipator® integral control system which meters the heating medium demand to exact proportions of hot water requirements and regulates hot water outlet temperature to a close tolerance of ±4°F from the setpoint.

This schematic shows the general arrangement of the P-K COMPACT. Steam passes through the tubes of the heat exchanger bundle. The water is rapidly heated as it is directed over the tubes by segmental baffles inside a cylindrical wrapper. Above the wrapped tube bundle, minimum storage volume is provided to give the controls sufficient time to produce the close temperature control.

FEATURES/BENEFITS OF THE P-K COMPACT WATER HEATER

- High-quality design and construction assure reliable performance and long service life.
- A complete package with only four piping connections enables quick, easy installation.
- Compact design saves valuable floor space and fits easily into position.
- High-capacity output: Up to 250 gpm at 40°F to 140°F allows the heater to meet the hot water requirements of any building.
- Performs equally well with steam, boiler water or high-temperature water.
- Anticipator® temperature control regulates hot water outlet temperatures ±4°F.
- Constant circulation by the pump prevents scale formation and improves temperature control.
- All nonferrous construction on the water side prevents rusty water.
- Tube bundle drops downward from the heater, so no overhead room is required for service.
- Double solenoid temperature-limit system prevents overheated water from entering the distribution system.
- Design meets seismic-restraint requirements, making it earthquake resistant.
- Built to A.S.M.E. standards; meets code requirements.
- Double-wall design available; meets B.O.C.A. and I.A.P.M.O. code requirements.
- Heat-transfer rates verified by independent testing agency, assuring that the heater will perform at rated capacity.

PK

COMPACT®

SIZING INSTRUCTIONS FOR THE P-K COMPACT

1. Determine total fixture units for all fixtures by using the Fixture Capacity Table and following the example below.
2. Determine the demand gpm from the Hot Water Demand Curves below.
3. Select the proper size heater from the Steam to Water or Boiler Water to Water Selection Tables on pages 10-13. For other capacities, contact your P-K representative or the factory.

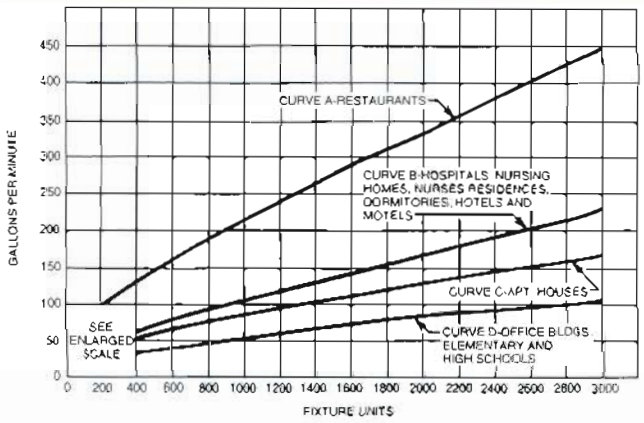
SIZE SELECTION

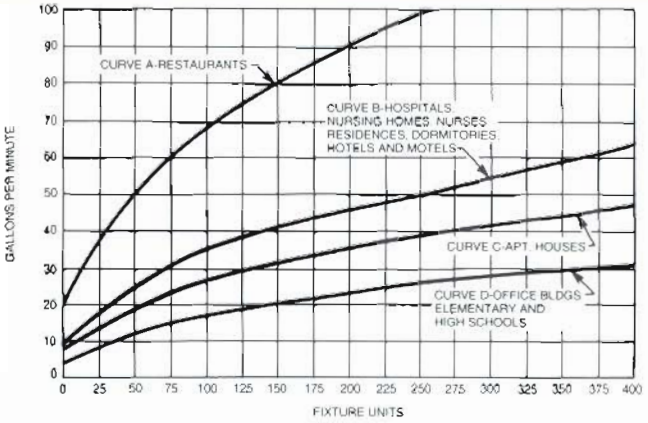
Select a heater to heat 75 gpm of water from 40°F to 140°F with steam in the line at 25 psig. From page 10 of the Selection Tables, select a size PKO8S to heat 80 gpm from 40°F to 140°F.

EXAMPLE: 200 ROOM HOTEL

NO. FIXTURES	TYPE OF FIXTURE	FIX. UNIT	DEMAND FIX. UNITS
200	Private Lavatory	75	150
10	Public Lavatory	1 0	10
20	Private Shower	1 5	30
185	Tub and Shower	1 5	278
10	Slop Basins	2 5	25
4	Barber Basins	2 0	8
6	Beauty Parlor Basins	2.5	15
Demand gpm from curve below 75 gpm.		TOTAL FIXTURE UNITS: 516	

HOT WATER DEMAND CURVES





These tables and the Preliminary Hot Water Demand Table are reprinted from the A.S.H.R.A.E. handbook (latest Systems Guide) with permission from A.S.H.R.A.E.

CORRECTION FACTOR FOR WATER TEMPERATURE VARIATIONS

The Fixture Capacity Table is based on consumption of 140°F hot water using 40°F cold water to obtain 100°F mixed water at the fixture. Any variation of these standard temperatures will affect the hot water consumption.

To determine the effect on the size of the P-K COMPACT, use the following procedure:

1. Determine heater size from instructions above.
2. Multiply the gpm rating by the correction factor from the following formula:

$$\frac{M-C}{H-C} \div \frac{M-40}{100} = \text{Correction Factor}$$

Where: M = mixed temperature at fixture, C = cold water temperature and H = hot water temperature from heater.

For example, if the heater determined above has a rating of 75 gpm from 40°F to 140°F and the actual cold water temperature is 70°F:

$$\frac{100-70}{140-170} \div \frac{100-40}{100} = .71 \text{ Correction Factor}$$

Therefore, the required gpm is: 75 x .71 = 54 gpm from 70°F to 140°F. Your heater selection would be size PK06S, which has a rating of 55 gpm from 70°F to 140°F. In most cases, the heater will operate at 140°F and a mixed temperature of 100°F is satisfactory; however, the cold water supply may vary from job to job.

Correction Factor for Cold Water Temperatures

Temperature - Cold Water Supply, °F	Correction Factor*
40	1.00
50	.93
60	.83
70	.71

*Based on 140°F water from the heater and 100°F mixed at fixture

% HOT FORMULA

The percentage of hot water for any application can be determined from the formula:

$$\frac{M-C}{H-C} \times 100 = \% \text{ Hot}$$

SHOWER APPLICATIONS

Special consideration should be given to applications involving periodic use of gang showers, such as may occur in field houses, gymnasiums, factories, institutions, YMCAs, etc. Use the following procedure: Multiply the number of shower heads by the hot water consumption rate in gpm. This gives the total gpm hot water draw rate. The maximum gpm of hot water may be modified in accordance with Correction Factor for Water Temperature Variations.

FIXTURE CAPACITY TABLE

140°F Temperature from Heater

PRELIMINARY HOT WATER DEMAND ESTIMATE

Type of Building	Unit	Fixture Units Per Unit
Hospital or Nursing Home	Room	2.50
Hotel or Motel	Room	2.50
Office Building	Person	0.15
Elementary School	Student	0.30*
Jr. and Sr. High Schools	Student	0.30*
Apartment House	Apartment	3.00

* Plus shower load.

HOSPITAL

Type of Fixture	Fix. Units
Private Lavatories	0.75
Public Lavatories	1.0
Semi-Private Lavatories	1.2
†Private Shower	1.5
†Ward Shower	2.5
†Semi-Private Shower	1.5
Private Bath	1.5
Ward Bath	2.0
Sink — Flushing Rim	2.0
Sink — Scrub-Up	1.5
Sink — Laboratory	1.5
Sink — General Purpose	1.0
Bath — Leg	6.0
Bath — Arm	4.0
Bath — Sitz	3.0
Bath — Foot	3.0
Bath — Emergency	2.0
Hydrotherapeutic Showers:	
#1 Shower Head	8.0
#2 Spray	1.2
Continuous Flow Bath:	
Continuous Flow Fill	2.0
Continuous Flow Operate	1.5
Hubbard	4.0
Autopsy Table	2.0
Autopsy Sink and Table	2.5

CLUB

Type of Fixture	Fix. Units
Private Lavatory	0.75
Public Lavatory	1.0
†Private Shower	1.5
†Public Shower	1.7
†Tub and Shower	1.5
Sink — Slop	2.5
36" Half Bradley	1.0
36" Full Bradley	1.5
54" Half Bradley	1.5
54" Full Bradley	2.0

GYMNASIUM

Type of Fixture	Fix. Units
Private Lavatory	0.75
Public Lavatory	1.0
†Private Shower	1.5
†Public Shower	3.0
Sink — Slop	1.5
Basin — Foot	1.2
36" Half Bradley	1.0
36" Full Bradley	1.5
54" Half Bradley	1.5
54" Full Bradley	2.0

ASSOC. BLDG. /YMCA

Type of Fixture	Fix. Units
Private Lavatory	0.75
Public Lavatory	1.0
†Private Shower	1.5
†Tub and Shower	1.7
Sink — Slop	2.5
Janitor Drop	2.0

RESTAURANT**

Type of Fixture	Fix. Units
Private Lavatory	0.7
Public Lavatory	2.0
†Private Shower	1.5
†Public Shower	1.7
Sink — Kitchen	3.0
Sink — Pantry	2.5
Sink — Slop	2.0
Sink — Pot (Single)	2.5
Sink — Pot (Double)	3.5
Sink — Pot (Triple)	5.5
Sink — Vegetable	2.0
Sink — Bar	2.5
Washer — Silver	2.0*
Washer — Glass	2.0*
Washer — Can	3.0
Coffee Urn	1.2
Baine Marie	1.0
Pot & Pan Washer	2.0*
Dish Pre-Rinse	2.5
Pre-Scraper	2.0
Pre-Scraper Conveyor	2.5
36" Half Bradley	1.0
36" Full Bradley	1.5

DISHWASHERS
(use booster to heat from 140°F to 180°F)

Type of Fixture	Fix. Units
Single Tank Stationary Rack:	
16 x 16 Rack	2.2
18 x 18 Rack	3.7
20 x 20 Rack	4.0
Multiple Tank Conveyor Type:	
Dishes — Inclined	2.0
Dishes — Flat	2.5
Single Tank Conveyor Type	2.3

HOTEL-MOTEL

Type of Fixture	Fix. Units
Private Lavatory	0.75
Public Lavatory	1.0
†Private Shower	1.5
†Tub and Shower	1.5
Basin — Barber	2.0
Sink — Slop	2.5
Basin — Beauty Parlor	2.5

OFFICE BLDG.

Type of Fixture	Fix. Units
Private Lavatory	0.75
Public Lavatory	1.0
†Private Shower	1.5
Sink — Slop	2.5
Janitor Drop	2.5
36" Half Bradley	1.0
36" Full Bradley	1.5

FACTORY

Type of Fixture	Fix. Units
Private Lavatory	0.75
Public Lavatory	1.0
†Private Shower	1.5
†Public Shower	3.0
Sink — Slop	2.5
36" Half Bradley	1.0
36" Full Bradley	1.5
54" Half Bradley	1.5
54" Full Bradley	2.0

CORRECTIONAL OR MENTAL INSTITUTION

Type of Fixture	Fix. Units
Private Lavatory	0.7
Public Lavatory	1.0
†Private Shower	1.5
†Public Shower	3.0
†Tub and Shower	1.5
Sink — Slop	2.0
Janitor Drop	2.0
36" Half Bradley	1.0
36" Full Bradley	1.5
54" Half Bradley	1.5
54" Full Bradley	2.0

APARTMENT

Type of Fixture	Fix. Units
Private Lavatory	0.75
Public Lavatory	1.0
†Private Shower	1.5
†Public Shower	1.5
†Tub and Shower	1.5
Sink — Kitchen	0.75
Sink — Slop	1.5
Sink — Pantry	1.5
Domestic Clothes Washer	1.2
Domestic Dish Washer	1.5
Laundry Tray	1.5

PRIVATE — PUBLIC SCHOOL

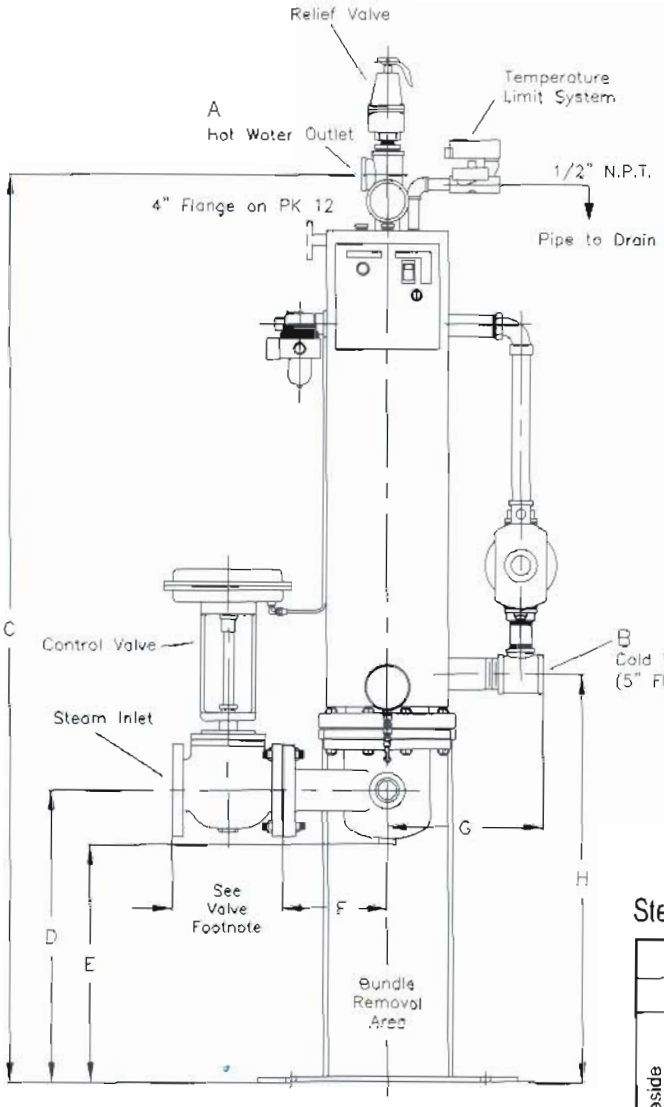
Type of Fixture	Fix. Units
Private Lavatory	0.75
Public Lavatory	1.0
†Private Shower	1.5
†Tub and Shower	1.7
Sink — Slop	2.5
Janitor Drop	1.5
Domestic Clothes Washer	2.0
Domestic Dish Washer	2.0

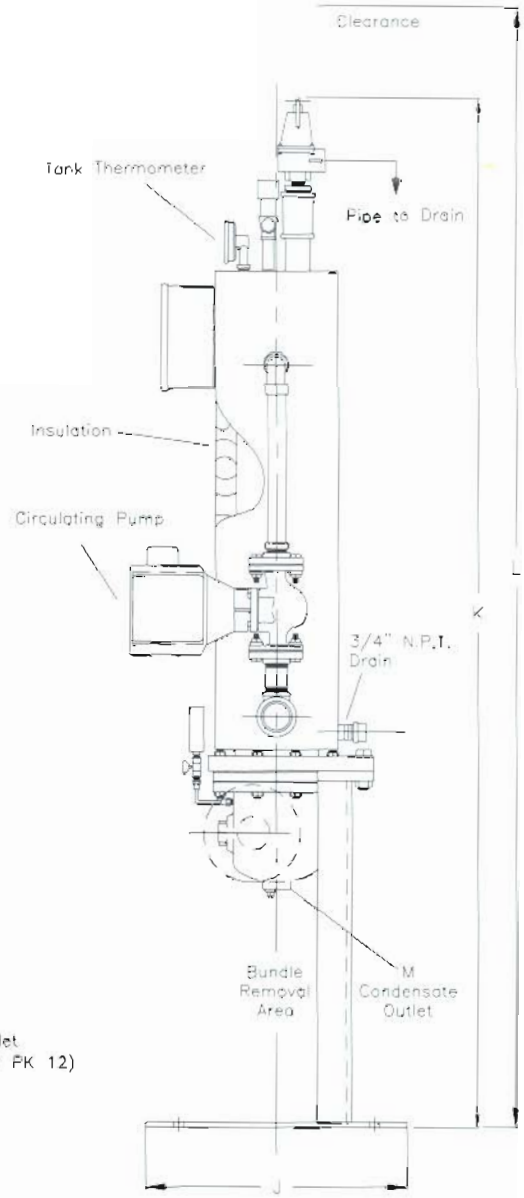
INSTITUTION — HOME

Type of Fixture	Fix. Units
Private Lavatory	0.7
Public Lavatory	1.0
†Private Shower	1.5
†Tub and Shower	1.5
Sink — Slop	2.0
Janitor Drop	2.0

* These items require 180°F hot water. The consumption figures are based on supplying 140°F water with a booster heater used to obtain 180°F water.
** Add 20% to all figures when not used in combination with other building services from the same heater.
† The fixture units listed for shower heads are based on a flow rate of 3 gpm. These units should be corrected for other flow rates. Multiply the fixture units by Correction Factor "C" from the formula: C = G x .33, where "C" = Correction Factor and G = gpm of shower head being used. Example: Shower head 4 gpm = C = 4 x .33 or 1.32. From Fixture Capacity Table, Hotel-Motel (showers) which shows 1.5 fixture units, multiply 1.5 x 1.32 = 2.0 fixture units per shower head using 4 gpm.

DIMENSIONS:
Steam to Water





Steam and Boiler Water

Component		Single Wall	Double Wall
Shell Side		SB-171-706 (Copper-Nickel)	
Tubeside	Tubes	SB-75-C12200 (Copper)	
	Tubesheet (inner)	SB-171-464 (Naval Brass)	
	Tubesheet (outer)	NA	SA-516-GR 70 (Carbon Steel)
	Bonnet	SA-278-Class 30 (Cast Iron)	
	Billet*	SA-516-GR 70 (Carbon Steel)	

* Boiler water and high-temperature water only.

DIMENSIONS IN INCHES

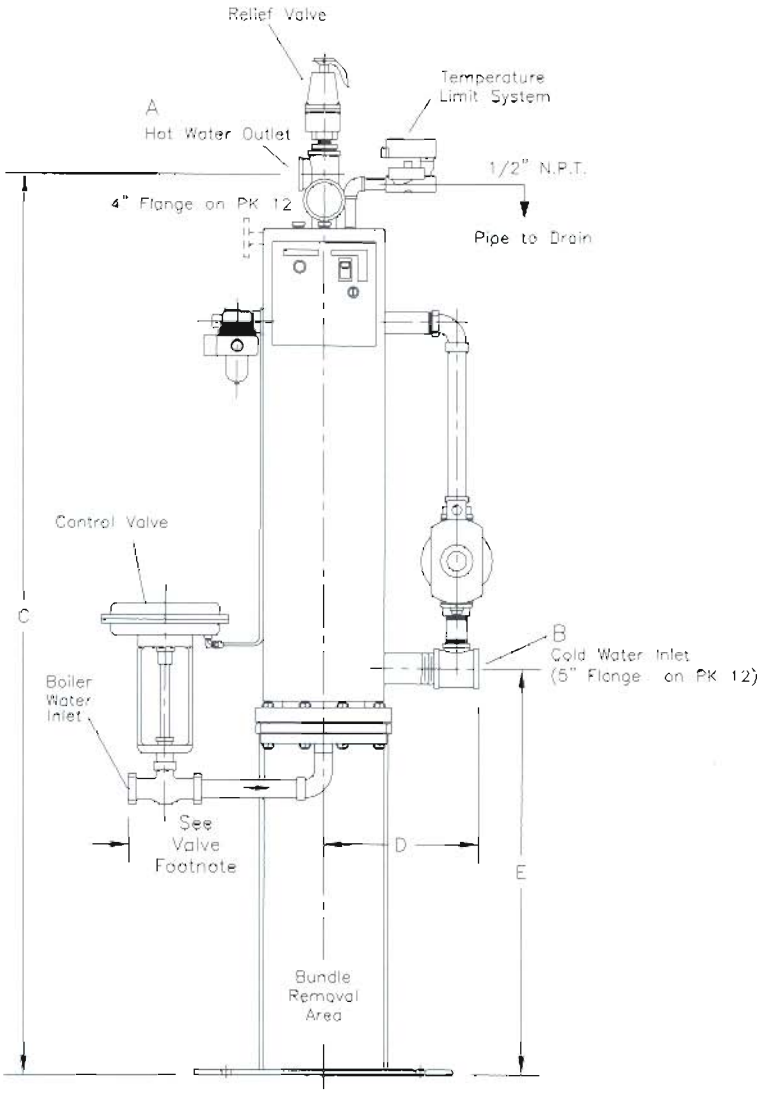
Roughing-In Dimensions Only

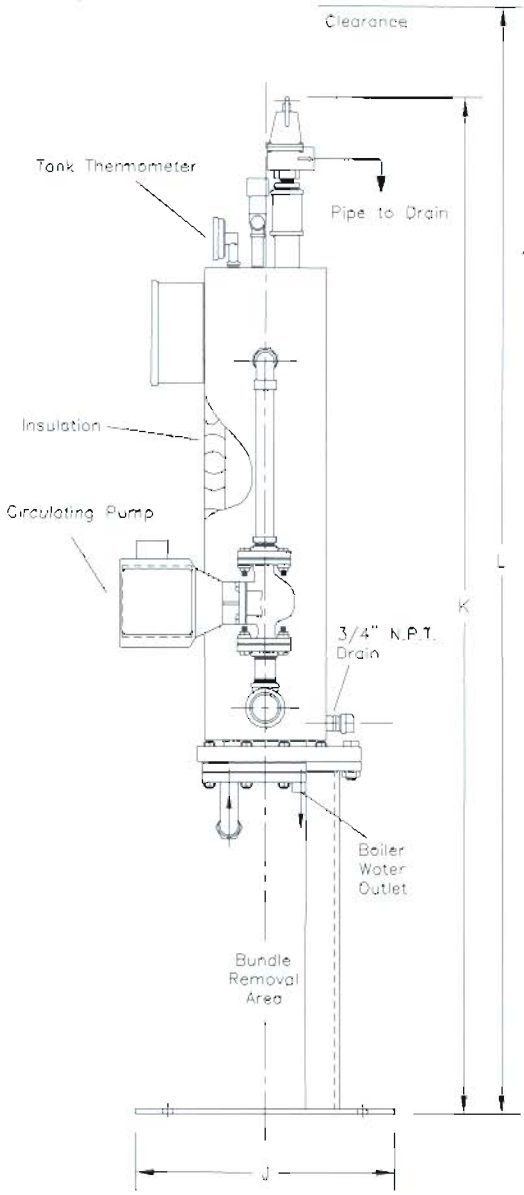
Model No.	A	B	C	D	E	F	G	H	J	K	L	M
PK06	1-1/2*	2*	69-1/8	22-1/4	18-1/8	8	12	31-1/8	20	78	85	3/4
PK08	2*	3*	69-1/4	22-1/8	18	8-3/4	13-7/8	31-3/4	20	78	84	1-1/2
PK10	2-1/2*	3*	72-3/4	22-5/8	17	12	14-3/4	33-1/2	24	81-1/2	89	2
PK12	4**	5**	85-1/2	29	23	11-1/4	18	41-3/8	34	97-3/4	101	2

Valve: Dimension varies with valve selected. Allow for maximum 16".
Pneumatic valve shown. Self-contained available.

* F.P.T
** 150 # flange

DIMENSIONS:
Boiler Water to Water





PRESSURE VESSEL DESIGN DATA
Steam and Boiler Water

Shellside	Design Pressure	155 psig
	Design Temperature	220°F
	Hydrostatic Test Pressure	330 psig
Tubeside	Design Pressure	150 psig
	Design Temperature	315°F
	Hydrostatic Test Pressure	300 psig

DIMENSIONS IN INCHES

Roughing-In Dimensions Only

Model No.	A	B	C	D	E	F	G	H
PK06	1-1/2*	2*	69-1/8	12	31-1/8	20	78	85
PK08	2*	3*	69-1/4	13-7/8	31-3/4	20	78	84
PK10	2-1/2*	3*	72-3/4	14-3/4	33-1/2	24	81-1/2	89
PK12	4**	5**	85-1/2	18	41-3/8	34	97-3/4	101

Valve: Dimension varies with valve selected. Allow for maximum 16".
Pneumatic valve shown. Self-contained available.

* FPT.
** 150 # flange

SELECTION TABLES: Steam to Water, Single Wall

How to use the Selection Tables: To obtain the Model Number, intersect the gpm with steam line pressure.
Example Required recovery: 38 gpm at 40°F to 140°F at 15 psig line pressure. Select Model Number PK08S

40°F to 120°F		LINE PRESSURE PSIG								
		2	5	10	15	25	40	50	75	100
GPM	Steam	BUNDLE PRESSURE PSIG								
	lb/hr	0	2	5	10	15	25	30	50	65
10	400	PK06S	PK06S	PK06S	PK06S	PK06S	PK06S	PK06S	PK06S	PK06S
20	800	PK06S	PK06S	PK06S	PK06S	PK06S	PK06S	PK06S	PK06S	PK06S
30	1200	PK06S	PK06S	PK06S	PK06S	PK06S	PK06S	PK06S	PK06S	PK06S
40	1600	PK08S	PK08S	PK06S	PK06S	PK06S	PK06S	PK06S	PK06S	PK06S
50	2000	PK08S	PK08S	PK08S	PK06S	PK06S	PK06S	PK06S	PK06S	PK06S
60	2400	PK08S	PK08S	PK08S	PK08S	PK08S	PK06S	PK06S	PK06S	PK06S
70	2800	PK08S	PK08S	PK08S	PK08S	PK08S	PK08S	PK06S	PK06S	PK06S
80	3200	PK10S	PK10S	PK08S	PK08S	PK08S	PK08S	PK08S	PK08S	PK08S
90	3600	PK10S	PK10S	PK08S	PK08S	PK08S	PK08S	PK08S	PK08S	PK08S
100	4000	PK10S	PK10S	PK10S	PK08S	PK08S	PK08S	PK08S	PK08S	PK08S
125	5000	PK12S	PK10S	PK10S	PK10S	PK08S	PK08S	PK08S	PK08S	PK08S
150	6000	PK12S	PK12S	PK10S	PK10S	PK10S	PK10S	PK10S	PK10S	PK10S
175	7000	PK12S	PK12S	PK12S	PK10S	PK10S	PK10S	PK10S	PK10S	PK10S
200	8000	—	—	PK12S	PK12S	PK10S	PK10S	PK10S	PK10S	PK10S

40°F to 140°F		LINE PRESSURE PSIG								
		2	5	10	15	25	40	50	75	100
GPM	Steam	BUNDLE PRESSURE PSIG								
	lb/hr	0	2	5	10	15	25	30	50	65
10	500	PK06S	PK06S	PK06S	PK06S	PK06S	PK06S	PK06S	PK06S	PK06S
20	1000	PK06S	PK06S	PK06S	PK06S	PK06S	PK06S	PK06S	PK06S	PK06S
30	1500	PK08S	PK08S	PK08S	PK06S	PK06S	PK06S	PK06S	PK06S	PK06S
40	2000	PK08S	PK08S	PK08S	PK08S	PK08S	PK08S	PK06S	PK06S	PK06S
50	2500	PK08S	PK08S	PK08S	PK08S	PK08S	PK08S	PK08S	PK06S	PK06S
60	3000	PK10S	PK10S	PK08S	PK08S	PK08S	PK08S	PK08S	PK08S	PK06S
70	3500	PK10S	PK10S	PK10S	PK08S	PK08S	PK08S	PK08S	PK08S	PK08S
80	4000	PK10S	PK10S	PK10S	PK10S	PK08S	PK08S	PK08S	PK08S	PK08S
90	4500	PK10S	PK10S	PK10S	PK10S	PK10S	PK08S	PK08S	PK08S	PK08S
100	5000	PK12S	PK10S	PK10S	PK10S	PK10S	PK08S	PK08S	PK08S	PK08S
125	6250	PK12S	PK12S	PK12S	PK10S	PK10S	PK10S	PK10S	PK10S	PK08S
150	7500	—	PK12S	PK12S	PK10S	PK10S	PK10S	PK10S	PK10S	PK10S
175	8750	—	—	PK12S	PK12S	PK12S	PK10S	PK10S	PK10S	PK10S
200	10000	—	—	—	PK12S	PK12S	PK12S	PK10S	PK10S	PK10S

NOTE For temperature ranges other than those shown here, please contact the P-K representative in your area

SELECTION TABLES: Steam to Water, Double Wall

Sizing selection for the double-wall design is similar to single wall as described on page 10.

40°F to 120°F		LINE PRESSURE PSIG								
		2	5	10	15	25	40	50	75	100
GPM	Steam	BUNDLE PRESSURE PSIG								
	lb/hr	0	2	5	10	15	25	30	50	65
6	240	PK06D	PK06D	PK06D	PK06D	PK06D	PK06D	PK06D	PK06D	PK06D
12	480	PK06D	PK06D	PK06D	PK06D	PK06D	PK06D	PK06D	PK06D	PK06D
18	720	PK06D	PK06D	PK06D	PK06D	PK06D	PK06D	PK06D	PK06D	PK06D
24	960	PK08D	PK08D	PK06D	PK06D	PK06D	PK06D	PK06D	PK06D	PK06D
30	1200	PK08D	PK08D	PK08D	PK06D	PK06D	PK06D	PK06D	PK06D	PK06D
36	1440	PK08D	PK08D	PK08D	PK08D	PK08D	PK06D	PK06D	PK06D	PK06D
42	1680	PK08D	PK08D	PK08D	PK08D	PK08D	PK08D	PK06D	PK06D	PK06D
48	1920	PK10D	PK10D	PK08D	PK08D	PK08D	PK08D	PK08D	PK08D	PK08D
54	2160	PK10D	PK10D	PK08D	PK08D	PK08D	PK08D	PK08D	PK08D	PK08D
60	2400	PK10D	PK10D	PK10D	PK08D	PK08D	PK08D	PK08D	PK08D	PK08D
75	3000	PK12D	PK10D	PK10D	PK10D	PK08D	PK08D	PK08D	PK08D	PK08D
90	3600	PK12D	PK12D	PK10D	PK10D	PK10D	PK10D	PK10D	PK10D	PK10D
105	4200	PK12D	PK12D	PK12D	PK10D	PK10D	PK10D	PK10D	PK10D	PK10D
120	4800	—	—	PK12D	PK12D	PK10D	PK10D	PK10D	PK10D	PK10D

40°F to 140°F		LINE PRESSURE PSIG								
		2	5	10	15	25	40	50	75	100
GPM	Steam	BUNDLE PRESSURE PSIG								
	lb/hr	0	2	5	10	15	25	30	50	65
6	300	PK06D	PK06D	PK06D	PK06D	PK06D	PK06D	PK06D	PK06D	PK06D
12	600	PK06D	PK06D	PK06D	PK06D	PK06D	PK06D	PK06D	PK06D	PK06D
18	900	PK08D	PK08D	PK08D	PK08D	PK06D	PK06D	PK06D	PK06D	PK06D
24	1200	PK08D	PK08D	PK08D	PK08D	PK08D	PK08D	PK06D	PK06D	PK06D
30	1500	PK08D	PK08D	PK08D	PK08D	PK08D	PK08D	PK08D	PK06D	PK06D
36	1800	PK10D	PK10D	PK08D	PK08D	PK08D	PK08D	PK08D	PK08D	PK06D
42	2100	PK10D	PK10D	PK10D	PK08D	PK08D	PK08D	PK08D	PK08D	PK08D
48	2400	PK10D	PK10D	PK10D	PK10D	PK08D	PK08D	PK08D	PK08D	PK08D
54	2700	PK10D	PK10D	PK10D	PK10D	PK10D	PK08D	PK08D	PK08D	PK08D
60	3000	PK12D	PK10D	PK10D	PK10D	PK10D	PK08D	PK08D	PK08D	PK08D
75	3750	PK12D	PK12D	PK12D	PK10D	PK10D	PK10D	PK10D	PK10D	PK08D
90	4500	—	PK12D	PK12D	PK10D	PK10D	PK10D	PK10D	PK10D	PK10D
105	5250	—	—	PK12D	PK12D	PK12D	PK10D	PK10D	PK10D	PK10D
120	6000	—	—	—	PK12D	PK12D	PK12D	PK10D	PK10D	PK10D

NOTE: For temperature ranges other than those shown here, please contact the P-K representative in your area.

40°F INLET WATER 20°BOILER WATER DIFFERENTIAL

		Boiler Water Temperature																					
		180 to 160				190 to 170				200 to 180				210 to 190				220 to 200				230 to 210			
Temp Range	Heater Size	Dom Wtr Flow gpm	Blr Wtr Flow gpm	PD psi	P a s s	Dom Wtr Flow gpm	Blr Wtr Flow gpm	PD psi	P a s s	Dom Wtr Flow gpm	Blr Wtr Flow gpm	PD psi	P a s s	Dom Wtr Flow gpm	Blr Wtr Flow gpm	PD psi	P a s s	Dom Wtr Flow gpm	Blr Wtr Flow gpm	PD psi	P a s s	Dom Wtr Flow gpm	Blr Wtr Flow gpm	PD psi	P a s s
40	PK06S	12	48	5.9	4	13	51	6 8	4	17	69	1.5	2	25	97	2.9	2	26	102	3.2	2	26	101	3 2	2
to	PK08S	25	99	6.9	4	37	149	1 9	2	50	197	3.3	2	49	196	3.3	2	49	196	3.2	2	49	195	3 2	2
120	PK10S	74	293	2.6	2	83	332	3.3	2	83	331	3.3	2	83	330	3.3	2	83	329	3.3	2	83	327	3 3	2
	PK12S	125	500	3.7	2	125	31	3 7	2	125	497	3.6	2	125	495	3.6	2	124	493	3.6	2	124	491	3 6	2
40	PK06S	5	23	4.7	6	6	31	2 6	4	10	49	6.1	4	25	97	2 9	2	14	70	1.5	2	19	96	2 9	2
to	PK08S	12	60	2.6	4	20	99	6 8	4	21	104	0.9	2	49	196	3 3	2	39	196	3.2	2	39	195	3 2	2
140	PK10S	33	167	6.9	4	41	202	1 3	2	66	327	3.2	2	83	330	3 3	2	66	329	3.3	2	66	327	3.2	2
	PK12S	64	320	1.6	2	100	499	3 6	2	100	497	3.6	2	125	495	3 6	2	100	493	3.6	2	99	491	3.6	2
40	PK06S	N/A				3	16	5 7	8	4	25	5.7	6	6	34	3	4	9	51	6.6	4	9	52	0 9	2
to	PK08S	4	21	2.7	8	7	42	4 3	6	11	67	3.2	4	16	98	6 7	4	19	114	1.1	2	28	168	2 4	2
160	PK10S	10	60	7.5	8	20	117	3.5	4	28	166	6.8	4	39	233	1 7	2	55	329	3.2	2	55	327	3 2	2
	PK12S	22	134	7.5	6	42	249	7.5	4	64	379	2.1	2	83	495	3.6	2	83	493	3.6	2	83	491	3 6	2
40	PK06S	N/A				N/A				N/A				3	19	7.3	8	4	28	6.9	6	5	37	3.5	4
to	PK08S	N/A				N/A				4	25	3.8	8	7	48	5.6	6	11	75	4.0	4	14	97	6.6	4
180	PK10S	N/A				N/A				10	68	4.0	6	20	136	4.7	4	24	164	6.7	4	38	266	2.2	2
	PK12S	N/A				N/A				21	145	2.7	4	36	248	7 4	4	64	441	2.9	2	71	491	3.5	2

40°F INLET WATER 40°F BOILER WATER DIFFERENTIAL

		Boiler Water Temperature															
		200 to 160				210 to 170				220 to 180				230 to 190			
Temp Range	Heater Size	Dom Wtr Flow gpm	Blr Wtr Flow gpm	PD psi	P a s s	Dom Wtr Flow gpm	Blr Wtr Flow gpm	PD psi	P a s s	Dom Wtr Flow gpm	Blr Wtr Flow gpm	PD psi	P a s s	Dom Wtr Flow gpm	Blr Wtr Flow gpm	PD psi	P a s s
40	PK06S	15	29	7.5	6	17	33	3.0	4	24	47	5.8	4	26	51	6.7	4
to	PK08S	36	71	3.6	4	50	99	6.8	4	49	98	6.8	4	53	106	1.0	2
120	PK10S	83	166	6.9	4	83	166	6.9	4	109	217	1.5	2	140	278	2.4	2
	PK12S	145	289	1.3	2	216	429	2.8	2	249	495	3.6	6	249	493	3.6	2
40	PK06S	6	15	4.7	8	8	20	3 7	6	12	29	7.5	4	14	34	3 1	4
to	PK08S	17	41	4.2	6	22	56	7 5	6	31	76	4.1	4	39	98	6 7	4
140	PK10S	38	95	2.4	4	63	156	6 1	4	67	165	6.8	4	68	167	0 9	2
	PK12S	100	248	7.5	4	100	248	7 5	4	135	334	1.7	2	198	490	3 6	2
40	PK06S	2	6	0.8	8	4	10	2 4	8	5	16	5.6	8	7	22	4 2	6
to	PK08S	5	16	1.6	8	10	31	5 7	8	15	46	5.1	6	19	56	7 5	6
160	PK10S	17	52	5.7	8	29	87	6 6	6	37	111	3.1	4	55	164	6 8	4
	PK12S	39	116	5.8	6	59	176	3 9	4	83	248	7.5	4	85	252	1 0	2
40	PK06S	N/A				N/A				2	7	1.2	8	3	12	3 1	8
to	PK08S	N/A				N/A				6	19	2.2	8	10	35	7 2	8
180	PK10S	N/A				N/A				17	60	7.5	8	27	93	7.5	6
	PK12S	N/A				N/A				38	134	7.5	6	60	207	5 3	4

60°F INLET WATER 40° F BOILER WATER DIFFERENTIAL

		Boiler Water Temperature											
		200 to 160				210 to 170				220 to 180			
Temp Range	Heater Size	Dom Wtr Flow gpm	Blr Wtr Flow gpm	PD psi	P a s s	Dom Wtr Flow gpm	Blr Wtr Flow gpm	PD psi	P a s s	Dom Wtr Flow gpm	Blr Wtr Flow gpm	PD psi	P a s s
60	PK06S	20	29	7.5	6	29	44	4.9	4	34	51	6.7	4
to	PK08S	59	88	5.5	4	66	99	6 8	4	66	98	6.7	4
120	PK10S	111	166	6.9	4	111	166	6 9	4	141	210	1.4	2
	PK12S	205	306	1.4	2	256	381	2 2	2	305	454	3.1	2
60	PK06S	9	17	6.4	8	12	24	5 3	6	15	29	7.5	6
to	PK08S	24	47	5.4	6	29	57	2.3	4	45	90	5.6	4
140	PK10S	52	103	2.7	4	83	166	6.8	4	83	165	6.8	4
	PK12S	125	249	7.5	4	125	248	7.5	4	184	365	2.0	2
60	PK06S	2	6	0.8	8	4	11	2 6	8	7	18	7.1	8
to	PK08S	7	16	1.6	8	14	34	6.8	8	21	51	6.3	6
160	PK10S	22	54	5.9	8	37	93	7.4	6	48	119	3.6	4
	PK12S	49	118	5.9	6	74	183	4 2	4	100	248	7.4	4
60	PK06S	N/A				N/A				2	7	1.1	8
to	PK08S	N/A				N/A				6	19	2.2	8
180	PK10S	N/A				N/A				20	60	7.5	8
	PK12S	N/A				N/A				45	134	7.5	6

NOTE.
For temperature ranges other than those shown here, please contact the P-K representative in your area.

SELECTION TABLES
Boiler Water to Water
Single Wall

COMPACT

40°F INLET WATER 20°BOILER WATER DIFFERENTIAL

		Boiler Water Temperature																							
		180 to 160				190 to 170				200 to 180				210 to 190				220 to 200				230 to 210			
Temp Range	Heater Size	Dom Wtr Flow gpm	Blr Wtr Flow gpm	PD psi	P a s s	Dom Wtr Flow gpm	Blr Wtr Flow gpm	PD psi	P a s s	Dom Wtr Flow gpm	Blr Wtr Flow gpm	PD psi	P a s s	Dom Wtr Flow gpm	Blr Wtr Flow gpm	PD psi	P a s s	Dom Wtr Flow gpm	Blr Wtr Flow gpm	PD psi	P a s s	Dom Wtr Flow gpm	Blr Wtr Flow gpm	PD psi	P a s s
40	PK06D	7	29	5.4	4	8	32	6 2	4	10	42	1.4	2	15	63	2 6	2	16	66	2.9	2	16	66	2 9	2
to	PK08D	15	62	6.5	4	22	89	1 8	2	30	123	3.1	2	30	123	3.1	2	30	123	3.1	2	30	123	3.1	2
120	PK10D	44	186	2.4	2	50	205	3 0	2	50	205	3.0	2	50	205	3.0	2	50	205	3.0	2	50	205	3.0	2
	PK12D	75	308	3.3	2	75	308	3 3	2	75	308	3.3	2	75	308	3.3	2	75	308	3.3	2	75	308	3.3	2
40	PK06D	3	16	4.3	6	4	21	4 2	6	6	31	5.6	4	6	31	5.6	4	9	47	1.4	2	12	62	2.6	2
to	PK08D	7	36	2.4	4	12	62	6 4	4	13	67	0.8	2	19	98	2.0	2	24	123	3.0	2	24	123	3 0	2
140	PK10D	20	102	6.3	4	25	127	1 2	2	40	205	2.9	2	40	205	2.9	2	40	205	2.9	2	40	205	2.9	2
	PK12D	39	198	1.4	2	60	308	3 2	2	60	308	3.2	2	60	308	3.2	2	60	308	3.2	2	60	308	3 2	2
40	PK06D	N/A				N/A				2	13	5.2	6	4	25	2.7	4	5	31	7.5	4	5	31	7 5	4
to	PK08D	3	19	1.8	6	4	25	4.0	6	7	43	3.0	4	10	62	6 3	4	12	75	1.0	2	17	105	2.2	2
160	PK10D	6	37	6.8	8	12	75	5.7	6	17	105	6.2	4	24	148	1.5	2	33	205	2.9	2	33	205	2 9	2
	PK12D	13	80	6.7	6	25	154	6 7	4	39	240	1.9	2	50	308	3.2	2	50	308	3.2	2	50	308	3 2	2
40	PK06D	N/A				N/A				N/A				N/A				2	15	6.3	6	3	22	5.7	6
to	PK08D	N/A				N/A				2	13	2.6	6	4	29	5 2	6	7	51	3.7	4	9	66	6.2	4
180	PK10D	N/A				N/A				6	44	3.6	6	12	86	4 3	4	15	108	6.1	4	23	166	2.0	2
	PK12D	N/A				N/A				13	93	4.3	6	22	158	6 6	4	39	282	2.6	2	43	308	3.1	2

40°F INLET WATER 40°F BOILER WATER DIFFERENTIAL

		Boiler Water Temperature															
		200 to 160				210 to 170				220 to 180				230 to 190			
Temp Range	Heater Size	Dom Wtr Flow gpm	Blr Wtr Flow gpm	PD psi	P a s s	Dom Wtr Flow gpm	Blr Wtr Flow gpm	PD psi	P a s s	Dom Wtr Flow gpm	Blr Wtr Flow gpm	PD psi	P a s s	Dom Wtr Flow gpm	Blr Wtr Flow gpm	PD psi	P a s s
40	PK06D	9	19	6.8	6	10	21	1 1	6	15	31	5.3	4	16	33	6 1	4
to	PK08D	22	46	3.4	4	30	62	6 4	4	30	62	3.3	4	32	66	0 9	2
120	PK10D	50	103	6.3	2	50	103	6 3	2	66	136	1.4	2	84	174	2 2	2
	PK12D	87	180	1.2	2	130	270	2 5	2	150	308	3.2	2	150	308	3.2	2
40	PK06D	4	11	3.1	6	5	13	3.4	6	7	18	6.8	6	9	24	5 1	6
to	PK08D	11	29	3.9	6	14	36	7.0	6	19	49	3.8	4	24	62	6 3	4
140	PK10D	23	60	2.2	4	38	98	5.5	4	41	108	6.0	4	41	108	8.0	4
	PK12D	60	155	6.7	4	60	155	6.7	4	81	210	0.8	2	119	308	3 2	2
40	PK06D	N/A				2	7	1 6	6	3	10	3.7	6	4	13	3 8	6
to	PK08D	3	10	1.5	8	6	20	5.3	8	9	28	4.8	6	12	38	7 0	6
160	PK10D	10	31	5.2	8	18	54	6 0	6	23	72	2.8	4	33	102	6.2	4
	PK12D	24	75	5.2	6	36	112	3.5	4	50	155	6.7	4	51	160	0 9	4
40	PK06D	N/A				N/A				N/A				N/A			
to	PK08D	N/A				N/A				4	15	2.1	8	6	22	6 7	8
180	PK10D	N/A				N/A				10	37	6.8	8	17	62	6.8	6
	PK12D	N/A				N/A				23	83	6.7	6	36	130	4.7	4

60°F INLET WATER 40° F BOILER WATER DIFFERENTIAL

		Boiler Water Temperature											
		200 to 160				210 to 170				220 to 180			
Temp Range	Heater Size	Dom Wtr Flow gpm	Blr Wtr Flow gpm	PD psi	P a s s	Dom Wtr Flow gpm	Blr Wtr Flow gpm	PD psi	P a s s	Dom Wtr Flow gpm	Blr Wtr Flow gpm	PD psi	P a s s
60	PK06D	12	19	6.8	6	18	28	4 5	4	21	33	6.1	4
to	PK08D	36	56	5.2	4	40	63	6 4	4	40	63	6.4	4
120	PK10D	67	104	6.3	4	67	104	6 3	4	85	132	1.3	2
	PK12D	123	192	1.2	2	154	240	2.0	2	183	285	2.8	2
60	PK06D	5	11	5.8	6	7	15	4.8	6	9	19	6.8	6
to	PK08D	15	31	5.1	6	18	38	2.2	4	27	56	5.2	4
140	PK10D	32	67	2.5	4	50	104	6 2	4	50	104	6.2	4
	PK12D	75	156	6.7	4	75	156	6 7	4	111	230	1.8	2
60	PK06D	N/A				2	5	2 4	6	4	11	6.5	6
to	PK08D	4	11	1.5	8	9	24	6 4	8	13	34	5.8	6
160	PK10D	14	35	5.4	8	23	61	6.7	6	29	75	3.3	4
	PK12D	29	75	5.2	6	45	117	6 6	6	60	157	6.6	4
60	PK06D	N/A				N/A				N/A			
to	PK08D	N/A				N/A				4	13	2.1	8
180	PK10D	N/A				N/A				12	38	6.8	8
	PK12D	N/A				N/A				27	84	6.7	6

SELECTION TABLES
Boiler Water to Water
Double Wall

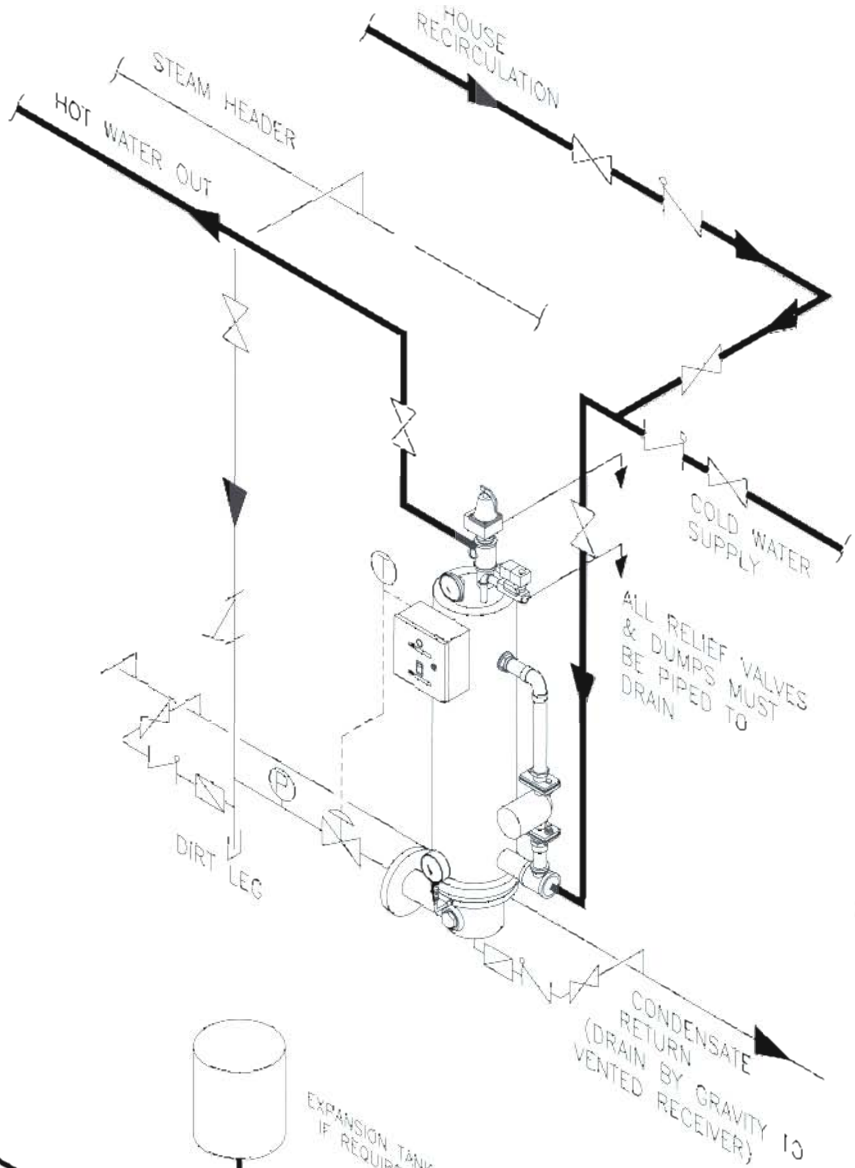
NOTE
For temperature ranges other than those shown here, please contact the P-K representative in your area.

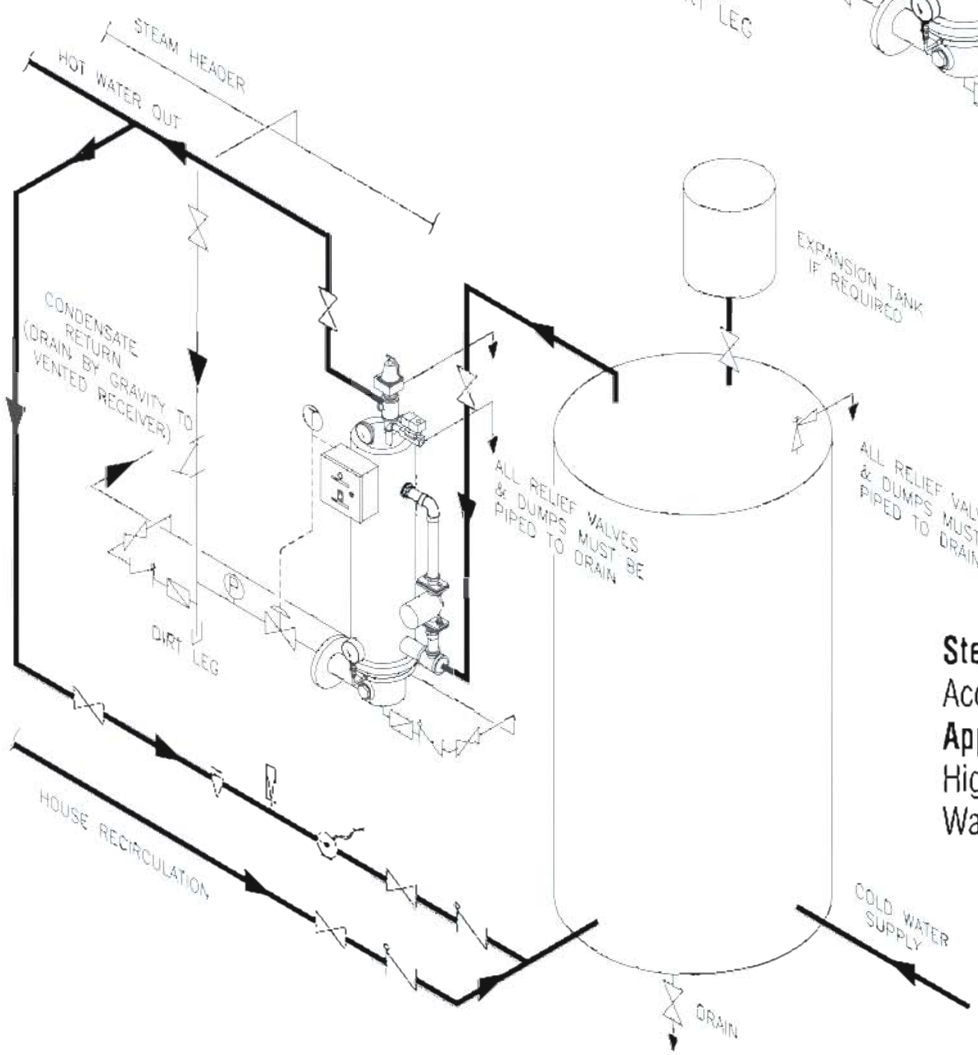
COMPACT

PIPING ARRANGEMENTS

Steam System:
Single Unit Installation

	Stop Valve		Strainer
	Check Valve		Relief Valve
	Control Valve		Thermometer
	Orifice Union		Steam Trap
T	Thermal Control Gage		Circulator
P	Pressure Gage		Balancing Cock
	Pipe Union or Flanges		Petcock
C	Compound Pressure Gage		Flow Indicator

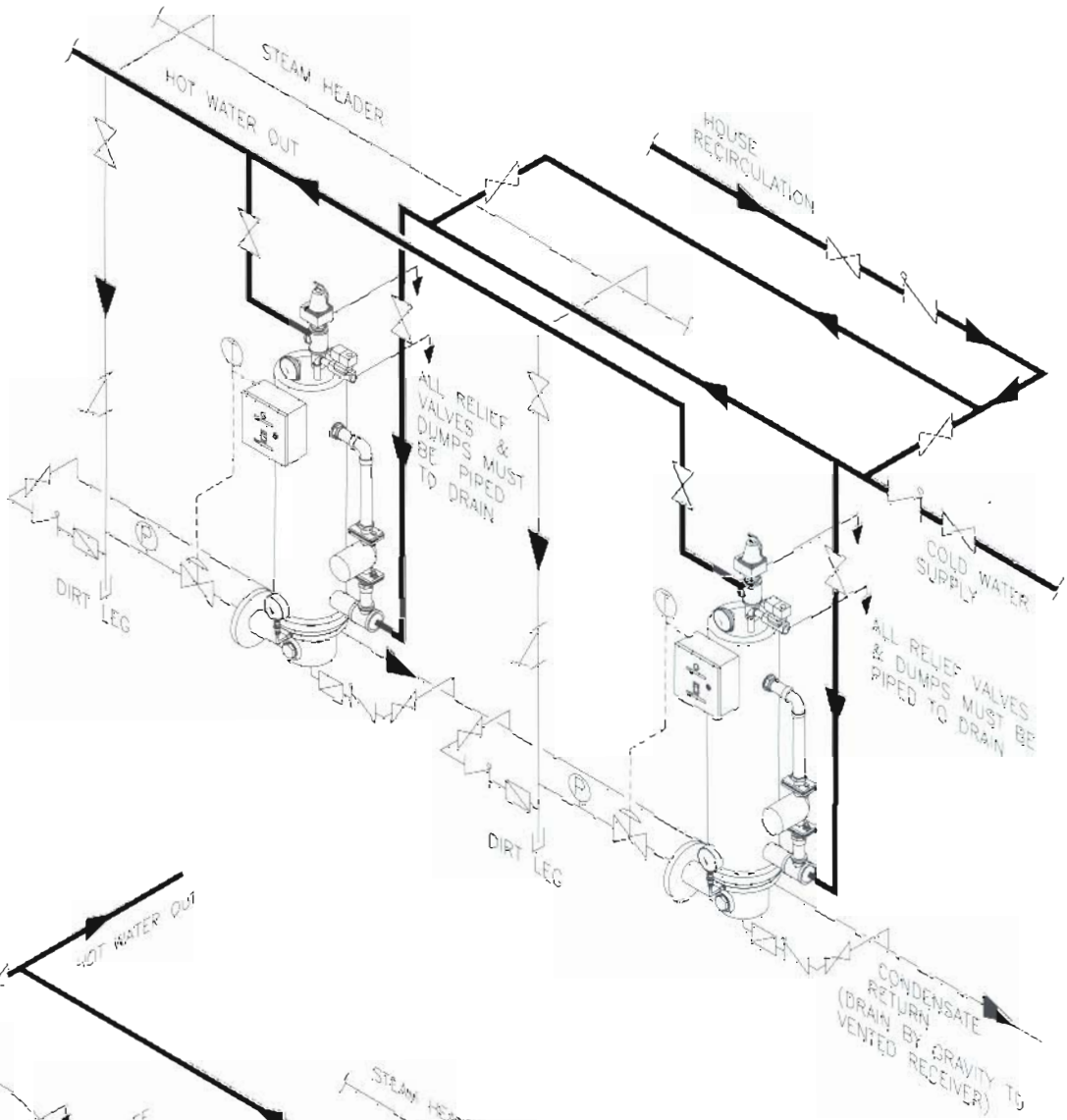


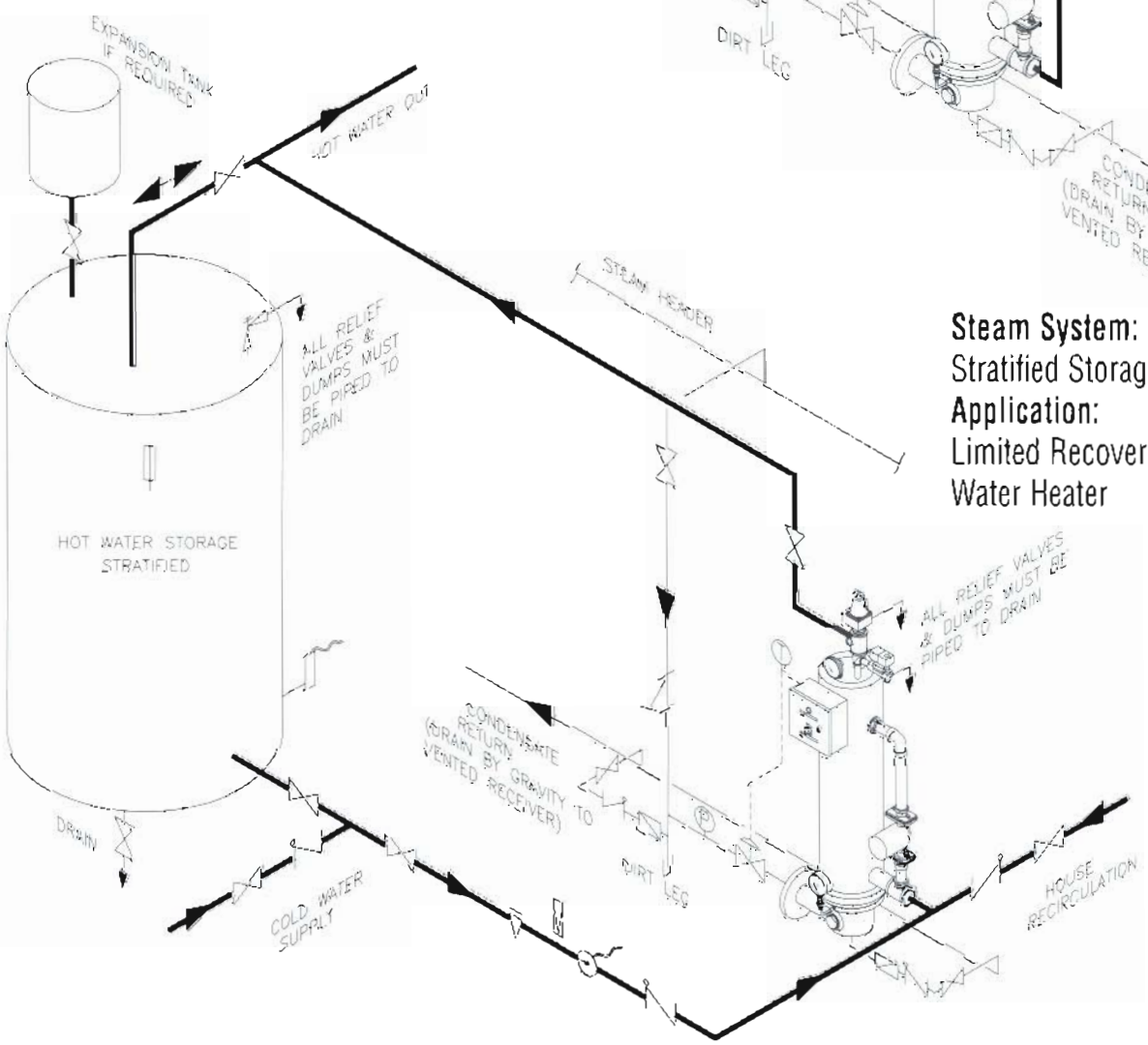


Steam System:
Accumulator Type Tank
Application:
High Recovery
Water Heater

PIPING ARRANGEMENTS

Steam System:
Parallel Installation



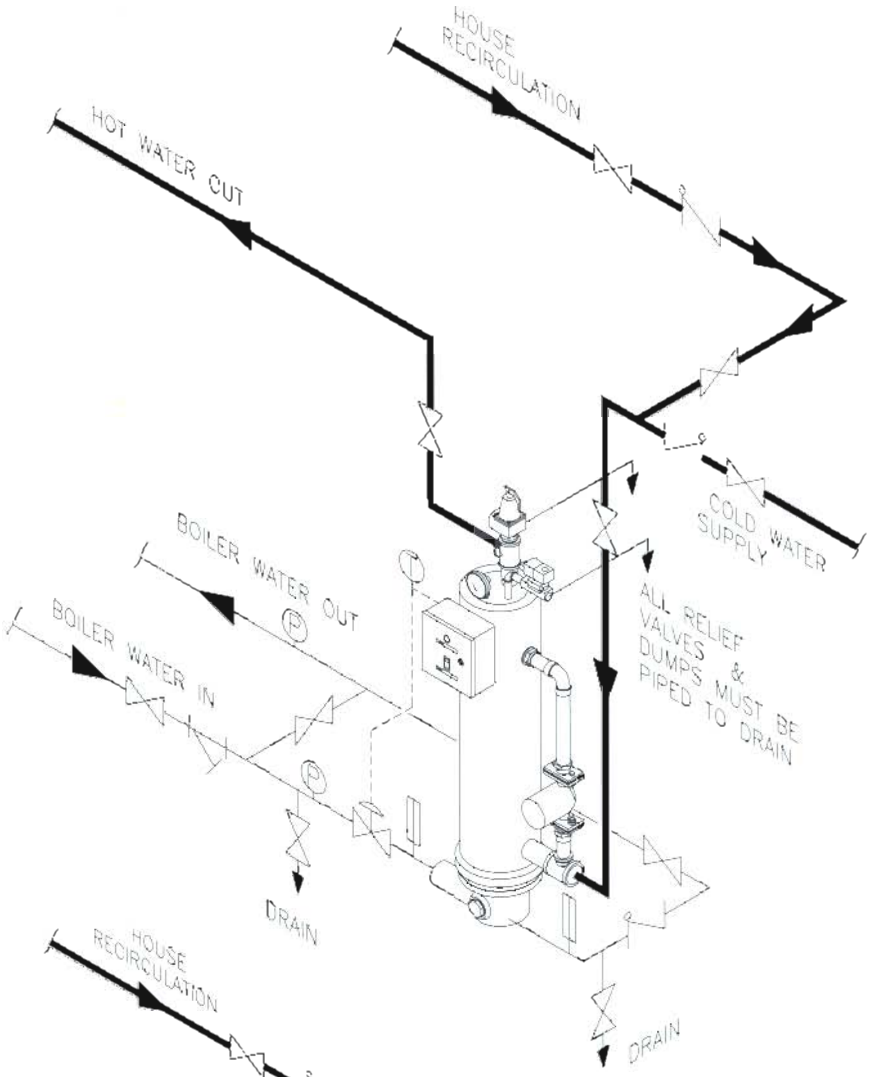


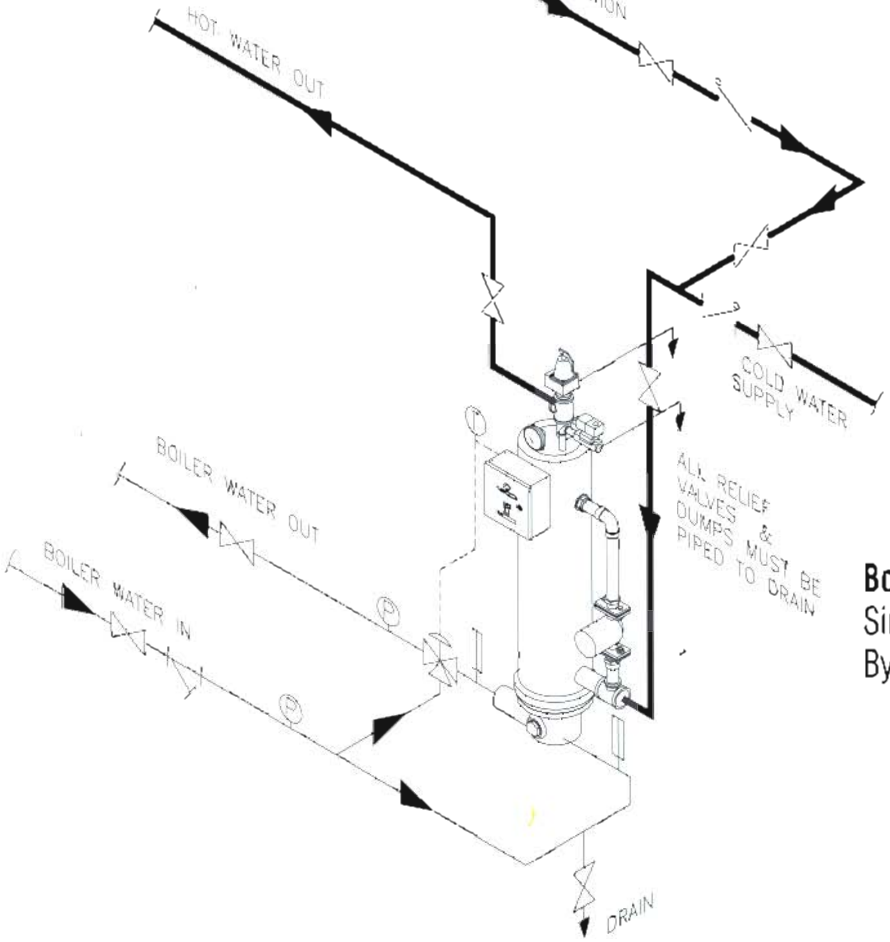
Steam System:
Stratified Storage
Application:
Limited Recovery
Water Heater

PIPING ARRANGEMENTS

Boiler Water System:
Single Unit Installation
Two-Way Control Valve

	Stop Valve		Strainer
	Check Valve		Relief Valve
	Control Valve		Thermometer
	Orifice Union		Steam Trap
T	Thermal Control Gage		Circulator
P	Pressure Gage		Balancing Cock
	Pipe Union or Flanges		Petcock
C	Compound Pressure Gage		Flow Indicator





Boiler Water System:
Single Unit Installation,
Bypass Control Valve

SPECIFICATIONS FOR
P-K COMPACT® Semi-Instantaneous Water Heater

STEAM TO WATER
BOILER WATER TO WATER

Furnish and install as shown on the plans _____ P-K COMPACT water heater(s), Model Number _____, manufactured by Patterson-Kelley Co.

Each water heater shall be a factory-assembled package, rated to heat _____ gpm of water from _____°F to _____°F, and control the domestic fixture outlet temperature to within ±4°F of the selected temperature when supplied with (select one):

Steam to Water:

_____ psig saturated steam before the control valve.

Boiler Water to Water:

_____ gpm of boiler water entering at _____°F and leaving at _____°F.

Due to overhead clearance restrictions, each heater shall be capable of being disassembled in place, for maintenance and inspection purposes, without having to remove the shell from the domestic water piping. The heater's support shall provide ample clearance for tube bundle removal. A full diameter threaded tube sheet shall be provided to allow for inspection and maintenance while the shell remains under pressure.

Each packaged water heater shall consist of the following components, completely factory-assembled, ready for connection to services:

1. P-K COMPACT water heater with vertical support.
2. Bronze A S M E. rated pressure and temperature relief valve set at 150 psig and 210°F
3. Bronze circulator pump pre-wired with pilot lighted ON/OFF switch operating at 115 volts/60 hertz/single phase. The purpose of the pump is to prevent scale.
4. Double solenoid temperature limit system.
5. Insulation is in accordance with the current A S.H R A E standards. It is a flexible foam insulation laminated to a durable, reinforced PVC jacket.
6. Integral Anticipator® temperature control system

Steam to Water

7. Temperature control valve — steam pilot operated or pneumatic with air kit (select one)
8. Float and thermostatic trap
9. Domestic water thermometer (3-1/2" diameter dial minimum) direct mounted with separable thermowell.
10. Steam pressure gauge (3-1/2" diameter dial minimum) with shut off cock

Boiler Water to Water

7. Boiler water control valve - 2 way (or 3-way bypass) pneumatic with temperature controller and air kit NOTE: 3-way valve not suitable for service over 250°F. Diverting valves will not be accepted
8. Domestic water thermometer (3-1/2" diameter dial minimum) direct mount with separable thermowell
9. Boiler water thermometer (3-1/2" diameter dial minimum) direct mount with separable thermowell.

MATERIALS OF CONSTRUCTION

SHELL — 90/10 Copper-Nickel, A.S M.E certified for 155 psig working pressure
TUBES — Copper or 90/10 Copper-Nickel (select one)
Single Wall or Double Wall (select one)
TUBE SHEET — Solid Copper Alloy
BAFFLES — Teflon
SHELL CONNECTIONS — Solid Copper Alloy

FINAL ASSEMBLY

The entire water heater shall be factory-assembled and tested, requiring only connection to services. Complete operating, adjustment and start-up instructions shall be provided in booklet form

GUARANTEE

The heater manufacturer shall guarantee all components and workmanship for one year from date of start-up, provided that the units are started within six months from date of shipment. The manufacturer shall also guarantee that the heater will perform at rated capacity, as verified by an independent testing laboratory. The following components are to carry an extended, unconditional, non-prorated guarantee, which shall be included as part of the submittal:

TUBE BUNDLE

The entire tube bundle assembly, from the steam inlet to the condensate outlet, shall be guaranteed for 10 years against failure from thermal shock, mechanical failure or erosion.

PRESSURE VESSEL

20-year guarantee against leakage

ANTICIPATOR® TEMPERATURE CONTROL

20-year guarantee against any failure

PATTERSON-KELLEY
Harsco
100 Burson Street
East Stroudsburg, PA 18301
Phone: 570.421.7500
Fax: 570.476.7247
www.pkwaterheaters.com