FAMCO
هامـرصنعت

Hot water boiler room

Three Pass
Hot water Boiler

Packman three pass boilers are fabricated in workshops equipped with the most modern machines. Materials and workmanship are under a permanent quality control to construct the reliable elements and groups. Reliable to make sure that you can rely on your PACKMAN boiler, even after a number of years. And these are the Bellow are the advantages of packman three pass boilers:

The boilers are adjusted to the plant by heating circuit environment and construction conditions.

- Adaptation of the thermal layout to fuel, medium and operation
- Adjusting of the boiler to the plant with regard to heating circuit environmental and constructional conditions
- Dimensioning and material selection are according to thermal stress and charge.
- Type of the design construction is based on the greatest possible elasticity to tolerate thermal stresses.
- Higher heating is possible by cooling the flue gas touched surfaces with water and reducing the radiation heat losses.
- Higher heating is possible by cooling the flue gas touched surfaces with water and reducing the radiation heat losses.
- With recent techniques it is possible to reduce losses and energy consumption, besides the more economical operation is achieved by optimum controllability.

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تهران، کیلومتر۲۱ بزرگراه لشگری (جاده مخصوص کرج)
روبـروی پالایشگاه نفت پـارس، پلاک ۱۲

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هابـرصنعت

Three-pass Boiler

The three pass boiler is robust and economical. The furnace is formed with fire tubes. The flue gases are directed to the top smoke tubes where they are cooled down. Most of the large water capacity boilers are made of this type, as it is proved that three flue gas passes is more economical. Because of its structure the three pass boiler is also suitable for liquid and gaseous fuels, coal and wood combustion.

Fire tube: In the three pass boiler the combustion chamber is formed with fire tubes. The chosen diameter guarantees the desired flame and a complete but out. Based on the diameter and working pressure, it is decided to whether chose plane fire tubes or spiral one. The arrangement in the inferior part of the water space has an especially favorable effect on the heat exchange and the water circulation, and allows a clear arrangement of the remaining flue gas passes.

Boiler supports, skids: The boiler body stands on supports. Most of the unit are delivered with skids; So there is no need special foundation for installation. In this case, also all the accessories necessary for operation, such as oil or gas firing equipment, combustion air fan, oil preheater, control panel or switchboard and feeding device, can be mounted on the skid.

Boiler body, insulation: The cylindrical boiler body forms the water and steam apace and contains the heating surfaces. Outside it is provided with a highly effective insulation as well as with a cladding of stainless steel sheets (at both sides). All connection pieces with mountings, fittings, control instruments as well as service platform, flue gas reversing chambers and flue gas duct are mounted at boiler body. Man-and hand-holes allow inspection at the water side and also the heating surfaces.

Smoke tubes: The second and third boiler pass are formed by thick-walled smoke tubes which are welded into the end plates. The tubes are easily accessible and can be cleaned without problems. The arrangement of the smoke tubes is according to the rules of ascending flue passes in order to prevent the formation of residual-or lingering gases.

Scan this code To access the Pakman product selection application and select this product.

Scan this code to receive a 3D product file.

More info about this product.

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Rear reversing chamber: PACKMAN three pass boilers with a fire tube have an interior flue gas reversing chamber, situated in the water space. Here the direction of the flue gases, coming out of the fire tube is changed and they are distributed to the smoke tubes of the second pass. The all over cooling of the reversing chamber contributes to an optimum heat utilization. The exterior reversing chamber is formed of tightly welded tube walls; Which is water cooled (Wet Back) and absolutely gas tight. for this type, also an economical heat utilization has been drawn into consideration. Access openings allow a flue gas side inspection of the interior and exterior reversing chamber.

Front reversing chamber: Inside of a tightly welded and insulated chamber made of steel sheets the flue gases are passing from the second to the third boiler pass. The reversing chamber is equipped with large doors, allowing free access to the smoke tubes and easy maintenance and cleaning. High quality tightening material guarantees that the doors seal the gas tightly. Special literature on three-pass boiler with wood or coal fuels as well as on special constructions can be sent upon request. In addition our engineers and other representatives are always at your disposal for further information and assistance.

Product Capacity Calculation & Selection:

The hot water boiler selected based on type of building, load of heating, configuration and layout to arrangement boilers.

The better way to select the capacity of the boiler is the following steps:

1- Calculate the maximum heat load based on your building type

2- Adding 20% to maximum load for coefficient of confidence

3- Consider the 85% average efficiency for three pass hot water boiler.

4-Determine the number of boiler you have: for 2 boilers you should normally select one boiler up to 75% full load and for 3 boiler you can select based on 50 % of full load for each boiler

Finally you can select the model from the table in bellow.

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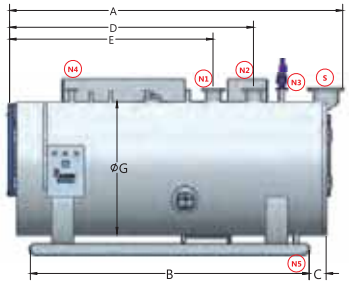

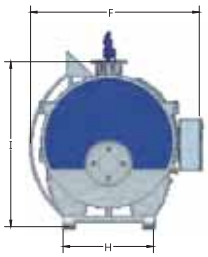

Technical data		Model / CAPACITY (KW)						
		PHWBN 1000	PHWBN 1250	PHWBN 1500	PHWBN 1750	PHWBN 2000	PHWBN 2500	PHWBN 3000
Heating Surface (Sq. m)	–	37.2	46.2	55.7	63.3	74.3	89.2	111
Output (kcal/h) [x1000000]	--	0.86	1.07	1.29	1.50	1.72	2.15	2.58
Pressure drop in boiler(mbar)	–	3.92	5.88	4.12	6.05	4.17	6.7	5.13
APPROXIMATE FUEL CONSUMPTION AT RATED CAPACITY BASED ON NOMINAL 82% EFFICINCY								
Firing Rate Gas (m3/h)	--	100	125	150	175	200	250	300
Firing Rate fuel oil (lit/h)	--	93.1	116.4	139.7	163.1	186.3	232.8	279.5
Firing Rate Heavy fuel oil (lit/h)	–	87.8	109.8	131.7	153.7	175.6	219.6	263.5
LENGTHS								
Overall	A	4020	4420	4320	4730	4630	5050	5050
Skid	B	3320	3500	3500	3700	3700	4000	4000
Skid to Rear Door	C	200	350	330	450	370	500	380
Boiler Front to Water Outlet Flange	D	3040	3330	3280	3600	3550	3990	3930
Boiler Front to Water Return Flange	E	2590	2880	2830	3150	3000	3440	3390
WIDTHS								
Overall	F	1950	1950	2200	2200	2400	2400	2800
Boiler O.D.	G	1530	1530	1700	1700	1850	1860	2080
External Skid Width	H	1000	1000	1120	1120	1240	1240	1400
HEIGHTS								
Water Outlet Flange to Ground	I	2030	2030	2180	2180	2350	2350	2550
Skid I-Beam Size (IPN)	J	(I)160	(I) 160	(I) 160	(I)160	(I)160	(II)160	(II)160
Skid Height	K	315	315	300	300	300	300	300
CONNECTIONS								
Water Return	M	4”	5”	6”	6”	6”	6”	8”
Water Outlet	N	4”	5”	6”	6”	6”	6”	8”
Drain	O	1 ½”	1 ½”	1 ½”	1 ½”	1 ½”	1 ½”	1 ½”
Safety Valve	P	1 ¼"	1 ¼"	1 ¼"	1 ½”	1 ½”	1 ½”	2"
Expansion Tank	Q	1 ½”	1 ½”	1 ½”	2"	2"	2"	2"
Stack I.D.	R	14”	14”	16”	16”	16”	16”	20”
MINIMUM BOILER ROOM CLEARANCES								
Front Clearance	--	3300	3700	3600	4000	3900	4300	4200
Rear Clearance	--	1000	1000	1000	1000	1000	1000	1100
Side Clearance	--	600	600	600	600	600	600	900
Boiler Room Length (Min.)	–	8250	9100	8950	9750	9550	10500	10500
BOILER WEIGHT								
Shipping Weight (@10 bar)	--	4260	4590	5660	5980	7390	7890	9260

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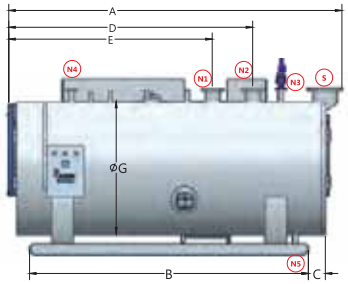

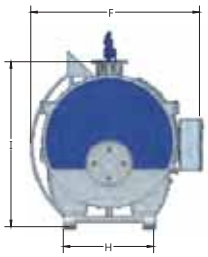

Technical data		Model / CAPACITY (KW)							
		PHWBN 3500	PHWBN 4000	PHWBN 5000	PHWBN 6000	PHWBN 7000	PHWBN 8000	PHWBN 9000	PHWBN 10000
Heating Surface (Sq. m)	–	127	148	185	223	260	297	334	371
Output (kcal/h) [x1000000]	--	3.01	3.44	4.30	5.16	6.02	6.88	7.74	8.60
Pressure drop in boiler(mbar)	–	6.3	5.89	6.5	6.8	7.5	7.8	8.1	8.5
APPROXIMATE FUEL CONSUMPTION AT RATED CAPACITY BASED ON NOMINAL 82% EFFICINCY									
Firing Rate Gas (m3/h)	--	350	400	500	600	700	800	900	1000
Firing Rate fuel oil (lit/h)	--	326.1	372.6	465.7	558.9	652.1	745.2	838.3	931.5
Firing Rate Heavy fuel oil (lit/h)	–	307.4	351.3	439.2	527.1	614.9	702.7	790.6	878.4
LENGTHS									
Overall	A	5350	5390	5510	5850	6050	6450	6540	7000
Skid	B	4000	4000	4000	4800	5000	5000	5000	5500
Skid to Rear Door	C	570	570	700	400	385	260	640	345
Boiler Front to Water Outlet Flange	D	4080	3510	4340	4730	5000	5200	4720	5420
Boiler Front to Water Return Flange	E	3510	3640	4030	4300	4490	4500	3800	4620
WIDTHS									
Overall	F	2800	3000	3200	3400	3600	3700	3800	3900
Boiler O.D.	G	2080	2190	2340	2530	2670	2740	3030	3250
External Skid Width	H	1400	1500	1600	1770	1860	2000	2150	2300
HEIGHTS									
Water Outlet Flange to Ground	I	2550	2700	2850	3070	3200	3400	3570	3780
Skid I-Beam Size (IPN)	J	(II)160	(II)180	(II)180	(II) 180	(II)180	(II) 180	(II) 200	(II) 200
Skid Height	K	300	330	330	350	350	350	350	350
CONNECTIONS									
Water Return	M	8”	10"	10"	10"	10"	10"	10"	12"
Water Outlet	N	8”	10”	10”	10”	10”	10”	10”	12”
Drain	O	1 ½”	2”	2”	2”	2”	2”	2”	2”
Safety Valve	P	2 ½”	3"	3"	3"	3"	3"	3"	3"
Expansion Tank	Q	2"	2"	2"	2"	3"	3"	3"	3"
Stack I.D.	R	20”	20”	24”	24”	24”	24”	30”	30”
MINIMUM BOILER ROOM CLEARANCES									
Front Clearance	--	4500	4500	4560	4900	5100	5200	5300	5800
Rear Clearance	--	1100	1200	1300	1400	1500	1500	1600	1800
Side Clearance	--	900	1200	1200	1200	1200	1200	1500	1500
Boiler Room Length (Min.)	–	11000	11100	11400	12200	12700	13100	13550	14600
BOILER WEIGHT									
Shipping Weight (@10 bar)	--	9570	11140	12430	16020	18400	22000	23670	29500

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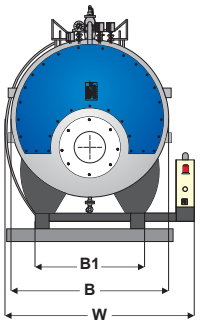
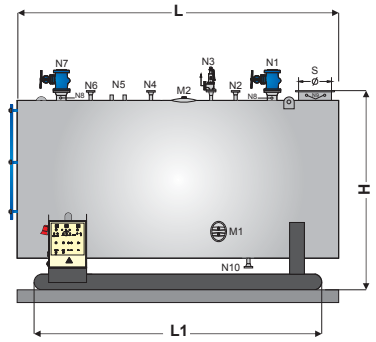
Hot water boiler type

PHWB 1





Boiler type			PHWB1	46	58	75	92	115	145	160
Thermal capacity			MW	0.46	0.58	0.75	0.92	1.15	1.45	1.60
water contents full			m^3	1.52	2.10	2.50	2.90	2.85	4.09	4.00
transport weight at 8 bar			t	3.05	3.50	3.60	4.50	4.60	5.50	5.60
service weight at 8 bar			t	5.00	6.00	6.00	7.50	7.50	10.60	10.60
press. Loss comp. Chamber			mbar	9.0	6.5	9.5	6.5	9.5	8.5	12.5
gas contents up to boiler end			m^3	0.57	0.84	0.84	1.01	1.01	1.70	1.70
Boiler dimensions	length	L	mm	2870	3070	3070	3300	3300	3500	3500
	width	B	mm	1260	1360	1360	1560	1560	1760	1760
	height	H	mm	2000	2140	2140	2340	2340	2540	2540
Ground frame	length	L1	mm	2740	2940	2940	3170	3170	3370	3370
	width	B1	mm	900	1000	1000	1100	1100	1200	1200
conn. piece distances										
outflow		L2	mm	430	480	480	450	450	450	450
safety valve		L3	mm	850	950	950	990	990	1040	1040
ex-tank		L4	mm	1920	1920	1920	1900	1900	2000	2000
return		L5	mm	2370	2570	2570	2620	2620	2770	2770
nominal widths and pressures outflow and return at Δt										
	20°C	PN40	DN	80	80	100	100	125	150	150
	30/40°	PN40	DN	50	65	65	80	80	100	100
	50°C		DN	40	50	50	65	65	80	80
safety valve make lesser at design pressure	6bar	PN25	DN	25	25	32	32	40	40	40
	8bar	PN25	DN	25	25	25	32	32	40	40
	10bar	PN25	DN	25	25	25	25	32	32	40
	13bar	PN25	DN	25	25	25	25	32	32	32
	16bar	PN25	DN	25	25	25	25	25	32	32
feeding		PN40	DN	25	25	25	25	25	25	25
drainage		PN40	DN	25	25	25	25	25	25	25
venting		PN40	DN	20	20	20	20	20	20	20

1 MW = 1000 KW = 860,000 Kcal/hr ; 1 Kcal/hr = 3.93 BTU/hr ; 1 bar = 14.504 psi
1 atm = 1.013 bar ; 1 kg/cm^2= 14.223 lb/sq in(psi); 1 BHP = 33,480 BTU/hr = 9.803 KW
All Specifications are subject to change without notice.

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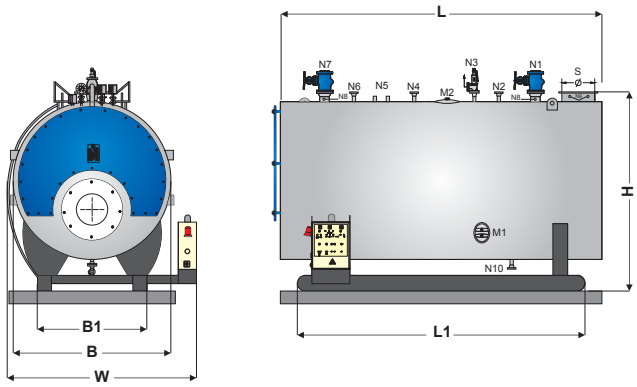
Hot water boiler type

PHWB 2



Boiler type			PHWB2	115	145	185	230	290	370	460	580	700	820	930
Thermal capacity			MW	1.15	1.45	1.85	2.30	2.90	3.70	4.60	5.80	7.00	8.20	9.30
water contents full			m^3	2.09	2.47	2.98	3.20	4.55	5.97	7.50	9.75	11.70	13.90	17.70
transport weight			t	3.47	4.11	4.66	5.94	7.24	8.26	10.37	13.4	15.41	17.71	2060
service weight			t	6.20	7.30	8.40	11.00	13.00	15.70	17.90	25.10	29.90	34.80	42.20
press. Loss comp. Chamber			mbar	9.5	9.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
gas contents up to boiler end			m^3	1.45	1.79	2.07	3.00	3.80	4.90	6.00	7.60	9.50	12.60	16.50
Boiler dimensions	length	L	mm	3750	3950	4050	4100	4700	4850	5050	5600	57500	6100	6450
	width	B	mm	1360	1460	1560	1710	1860	2010	2160	2310	2510	2260	2910
	height	H	mm	1650	1750	1850	2000	2150	2300	2450	2600	2800	2950	3200
Ground frame	length	L1	mm	3300	3500	3600	3650	4150	4300	4500	5000	5150	5500	5850
	width	B1	mm	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
conn. piece distances														
	outflow	L2	mm	650	650	650	650	750	750	800	900	900	900	900
	safety valve	L3	mm	1150	1200	1200	1250	1450	1150	1600	1700	1800	1900	1900
	ex-tank	L4	mm	2700	2900	3000	3000	3500	3650	3900	4350	4550	4900	4900
	return	L5	mm	3000	3200	3300	3350	3900	4000	4200	4750	4850	5200	5200
nominal widths and pressures														
outflow & return at Δt	20°C	PN 16	DN	125	150	150	200	200	200	250	250	300	300	300
	30/40°C	PN 16	DN	100	100	125	150	150	150	200	200	200	250	250
safety outflow		PN 16	DN	65	65	80	100	100	100	125	125	150	150	150
drainage		PN 40	DN	25	25	32	32	32	40	40	40	50	50	50

1 MW = 1000 KW = 860,000 Kcal/hr ; 1 Kcal/hr = 3.93 BTU/hr ; 1 bar = 14.504 psi
1 atm = 1.013 bar ; 1 kg/cm^2= 14.223 lb/sq in(psi); 1 BHP = 33,480 BTU/hr = 9.803 KW
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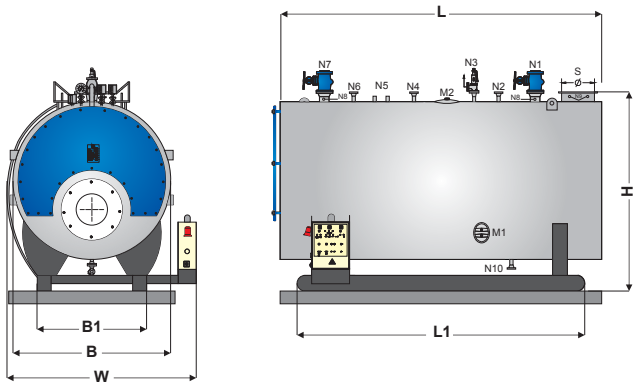
Hot water boiler type

PHWB 3



Boiler type			PHWB3	115	145	185	230	290	370	460	580	700	820	930
Thermal capacity			MW	1.15	1.45	1.85	2.30	2.90	3.70	4.60	5.80	7.00	8.20	9.30
water contents full			m^3	4.7	5.3	6.3	6.6	8.0	9.9	12.6	15.4	17.5	19.5	21.8
transport weight at 8 bar			t	6.5	6.8	7.7	8.6	10.4	11.7	14.4	16.7	19.8	23.5	25.5
service weight at 8 bar			t	12.5	13.0	15.5	18.0	21.5	26.0	31.5	37.0	43.5	52.0	56.0
press. Loss comp. Chamber			mbar	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.5
gas contents up to boiler end			m^3	1.70	2.50	3.20	4.50	4.80	5.20	6.30	7.20	10.60	13.80	17.50
Boiler dimensions	length	L	mm	3900	3900	4600	4700	5150	5250	5950	6050	6200	6650	6750
	width	B	mm	1700	1800	1950	2000	2150	2300	2500	2600	2750	2900	3000
	height	H	mm	1950	2050	2200	2250	2400	2550	2750	2850	3000	3150	3250
Ground frame	length	L1	mm	3450	3450	4050	4150	4550	4650	5350	5450	5600	5950	6050
	width	B1	mm	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
conn. piece distances	outflow	L2	mm	900	900	900	900	900	900	900	900	900	900	900
	safety valve	L3	mm	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
	ex-tank	L4	mm	2800	2800	3150	3300	3700	3750	4100	4200	4300	4500	4600
	return	L5	mm	3250	3250	3700	3900	4350	4450	5100	5100	5100	5500	5500
nominal widths and pressures outflow & return at Δt														
	20°C	PN*)	DN	125	150	150	200	200	200	250	250	300	300	300
	30/40°C	PN*)	DN	100	100	125	150	150	150	200	200	200	250	250
	50°C	PN*)	DN	80	80	80	100	100	125	150	150	150	200	200
safety valve make lesser at design pressure	6 bar	PN 25	DN	40	40	50	50	65	65	80	80	100	100	100
	8 bar	PN 25	DN	32	40	40	50	50	65	65	80	80	100	100
	10 bar	PN 25	DN	32	32	40	40	50	50	65	65	80	80	80
	13 bar	PN 25	DN	25	32	40	40	40	50	65	65	65	80	80
	16 bar	PN 25	DN	25	32	32	40	40	50	50	65	65	65	80
feeding		PN 40	DN	25	25	25	25	25	32	32	32	32	40	40
drainage		PN 40	DN	25	25	25	32	32	40	40	40	50	50	50
venting in outflow intermediary piece		PN 40	DN	20	20	20	20	20	25	25	25	25	25	25

*) up to DN 150 PN 40, from DN 200 on PN 25
1 MW = 1000 KW = 860,000 Kcal/hr ; 1 Kcal/hr = 3.93 BTU/hr ; 1 bar = 14.504 psi
1 atm = 1.013 bar ; 1 kg/cm^2= 14.223 lb/sq in(psi); 1 BHP = 33,480 BTU/hr = 9.803 KW
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w w w . f a m c o c o r p . c o m
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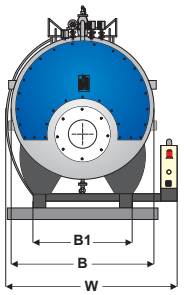
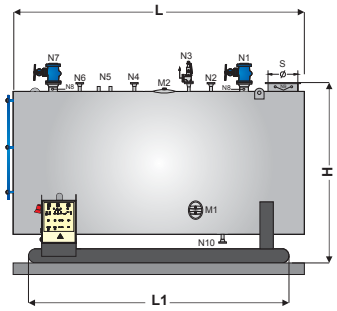
FAMCO هامـرصنعت

Hot water boiler type

PHWB 4





Boiler type			PHWB4	160	200	260	320	400	450	500	600	700	800	900
Thermal capacity			MW	1.60	2.00	2.60	3.20	4.00	4.50	5.00	6.00	7.00	8.00	9.00
water contents full			m³	6.03	7.40	9.48	11.87	13.34	13.69	13.91	17.54	18.73	20.46	24.10
transport weight at 8 bar			t	6.5	7.6	9.0	11.0	12.5	14.0	15.1	17.6	19.6	22.2	25.9
service weight at 8 bar			t	13.2	15.8	19.5	24.0	27.2	29.2	30.8	37.0	40.5	45.0	52.0
press. Loss comp. Chamber			mbar	11.0	11.0	11.0	11.0	11.0	11.5	12.5	12.5	13.0	12.5	12.0
gas contents up to boiler end			m³	3.00	3.80	4.80	6.25	7.40	8.80	9.60	11.75	13.50	15.25	19.00
Boiler dimensions	length	L	mm	4050	4650	5050	5450	5700	5900	6150	6500	6800	6800	7300
	width	B	mm	2100	2150	2300	2450	2550	2600	2600	2800	2850	3000	3150
	height	H	mm	2350	2400	2550	2700	2800	2850	2850	3050	3100	3250	3400
Ground frame	length	L1	mm	3200	3800	4200	4600	4800	5000	5200	5500	5800	5800	6300
	width	B1	mm	1400	1450	1550	1650	1750	1800	1800	1950	1950	2100	2200
conn. piece distances														
	outflow	L2	mm	700	700	700	750	750	800	850	900	900	900	950
	safety valve	L3	mm	1300	1350	1400	1550	1600	1650	1700	1800	1800	1850	1900
	ex-tank	L4	mm	2850	3450	3800	4100	4300	4400	4600	4900	5100	5000	5400
	return	L5	mm	3300	3900	4300	4650	4900	5000	5250	5600	5900	5900	6350
nominal widths and pressures outflow & return at Δt														
	20°C	PN*)	DN	150	200	200	250	250	300	300	300	350	350	400
	30°C	PN*)	DN	125	125	150	150	200	200	200	250	250	300	300
	40°C	PN*)	DN	100	125	125	150	150	200	200	200	200	250	250
	50°C	PN*)	DN	100	100	125	125	150	150	150	200	200	200	200
safety valve make lesser at design pressure														
	6 bar	PN 25	DN	50	50	65	65	80	80	80	100	100	100	125
	8 bar	PN 25	DN	40	50	50	65	65	65	80	80	80	100	100
	10 bar	PN 25	DN	40	40	50	50	65	65	65	80	80	80	80
	13 bar	PN 25	DN	32	40	40	50	50	50	65	65	65	80	80
	16 bar	PN 25	DN	32	32	40	40	50	50	50	65	65	65	65
	20 bar	PN 40	DN	25	32	32	40	40	50	50	50	65	65	65
	25 bar	PN 40	DN	25	32	32	32	40	40	40	50	50	50	65
feeding		PN 40	DN	25	25	25	25	32	32	32	32	32	40	40
drainage		PN 40	DN	25	25	32	32	32	40	40	40	50	50	50
venting in outflow intermediary piece		PN 40	DN	20	20	20	20	20	20	20	20	20	20	20

*) up to DN 150 PN 40, from DN 200 on PN 25
1 MW = 1000 KW = 860,000 Kcal/hr ; 1 Kcal/hr = 3.93 BTU/hr ; 1 bar = 14.504 psi
1 atm = 1.013 bar ; 1 kg/cm^2= 14.223 lb/sq in(psi); 1 BHP = 33,480 BTU/hr = 9.803 KW
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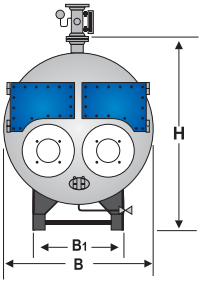
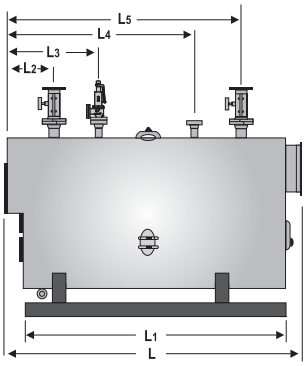
FAMCO
هابـرصنعت

Hot water boiler type

PHWB 5





Boiler type			PHWB5	1050	1200	1300	1450	1650	1850
Thermal capacity			MW	10.50	12.00	13.00	14.50	16.50	18.50
water contents full			m^3	25.50	27.90	29.05	33.80	37.15	40.36
transport weight at 8 bar			t	28.0	31.0	34.0	39.0	42.0	49.0
service weight at 8 bar			t	59.0	65.0	70.0	80.0	87.0	98.0
press. Loss comp. Chamber			mbar	12.0	12.0	12.0	13.0	10.5	10.0
gas contents up to boiler end			m^3	22.0	24.0	27.0	29.0	34.0	39.5
Boiler dimensions	length	L	mm	7400	7400	7400	7700	8200	8200
	width	B	mm	3400	3550	3650	3800	3900	4100
	height	H	mm	3850	4000	4100	4250	4350	4550
Ground frame	length	L1	mm	5750	5750	5750	6050	6550	6550
	width	B1	mm	1700	1800	1800	1900	1900	2000
conn. piece distances	outflow	L2	mm	1200	1200	1200	1200	1400	14000
	safety valve	L3	mm	2000	2000	2000	2000	2400	2400
	ex-tank	L4	mm	4700	4700	4700	4700	5000	5000
	return	L5	mm	5500	5500	5500	5500	6000	6000
nominal widths and pressures outflow & return at Δt									
	20°C	PN 25	DN	300	350	350	350	400	400
	30°C	PN 25	DN	250	250	250	300	300	350
	40°C	PN 25	DN	200	250	250	250	300	300
	50°C	PN 25	DN	200	200	200	250	250	250
safety valve make lesser at design pressure	6 bar	PN 25	DN	125	150	150	150	200	200
	8 bar	PN 25	DN	100	125	125	150	150	150
	10 bar	PN 25	DN	100	100	100	100	125	150
	13 bar	PN 25	DN	80	80	100	100	100	100
	16 bar	PN 25	DN	80	80	80	80	100	100
	20 bar	PN 25	DN	65	65	80	80	80	100
feeding	25 bar	PN 40	DN	50	50	50	65	65	65
drainage		PN 40	DN	50	50	50	65	65	65
venting		PN 40	DN	20	20	20	20	20	20

1 MW = 1000 KW = 860,000 Kcal/hr ; 1 Kcal/hr = 3.93 BTU/hr ; 1 bar = 14.504 psi
1 atm = 1.013 bar ; 1 kg/cm^2= 14.223 lb/sq in(psi); 1 BHP = 33,480 BTU/hr = 9.803 KW
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روبـروی پالایشگاه نفت پـارس، پلاک ۱۲

FAMCO
هابـرصنعت

Hot water
boiler room

تهران، کیلومتر۲۱ بزرگراه لشگری (جاده مخصوص کرج)
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FAMCO
هایپرصنعت

FIREBOX

Boiler

Processes and heating applications nowadays need to be powered by steam and hot water. The main technology for heat generation and energy process is the packaged fire tube boiler. The packaged fire tube boiler has proven to be highly efficient and cost effective in generating energy for process and heating applications. Efficient F.P.B three-pass designs are available from 100KW to 1200KW range. Our firebox boiler are equipped with a forced flat flame retention burner result in a high efficiency over 85. This boiler-burner combination gives reliable operation with minimum maintenance.

Scan this code To access the Pakman product selection application and select this product.

Scan this code to receive a 3D product file.

More info about this product.

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روبروی پالایشگاه نفت پارس، پلاک ۱۲

Standard features

All unit and factory products are packaged with operating control, relief valves burner and fuel train. The simple installation makes it possible that only service connections to be placed. Flexible burner systems are available for firing natural gas & oil or combination. High density 2” mineral wool insulation assures lower radiant heat loss.

Efficiency

Conventional atmospheric burners operate with high excess air up tp 300 causing the flame temperature to be decreased. Flame adiabatic temperature versus excess air amount is illustrated in fig. It is obvious that excess air has substantial effect on flame temperature and consequently on the rate of heat transfer and efficiency. Influence of excess air on thermal efficiency at different stack temperature is illustrated in fig. 2. Forced draft burners which are used in our boilers operate at lower excess air, about 10-30 percent.

This results in an acceptable efficiency about 84-85% with less operation cost. The initial cost of a boiler is the lowest portion of your boiler investment . Fuel costs and maintenance costs represent the largest portion of your boiler equipment investment. Some basic design differences can reveal variations in expected efficiency performance levels. Evaluating these design differences can provide insight into what efficiency value and resulting operating costs you can expect.

Product Capacity Calculation & Selection:

The hot water boiler selected based on type of building, load of heating, configuration and layout to arrangement boilers.

The better way to select the capacity of the boiler is the following steps:

1- Calculate the maximum heat load based on your building type

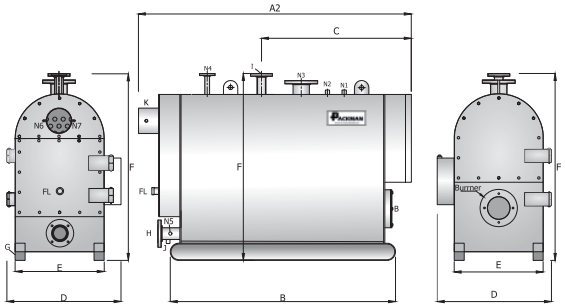
2- Adding 20% to maximum load for coefficient of confidence

3- Consider the 85% average efficiency for Three Pass boiler

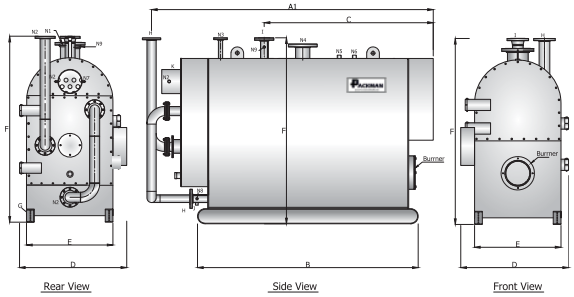
4- Determine the number of boiler you have: for 2 boiler you should normally select one boiler up to 75% full load and for 3 boiler you can select based on 50 % of full load for each boiler

Finally you can select the model from the following table.

100-400 KW



500-1200 KW



Model ▶		PHWB FB-100	PHWB FB-150	PHWB FB-200	PHWB FB-250	PHWB FB-325	PHWB FB-400	PHWB FB-500	PHWB FB-600	PHWB FB-700	PHWB FB-800	PHWB FB-1000	PHWB FB-1200
LENGTHS ▼	**Capacity (KW) ▶**	**100**	**150**	**200**	**250**	**325**	**400**	**500**	**600**	**700**	**800**	**1000**	**1200**
Overall	A1	–	—	—	—	—	—	2700	2850	3000	3150	3600	3800
	A2	1540	1690	1890	1960	2160	2360	---	---	---	---	---	---
Skid	B	1220	1360	1570	1570	1750	1950	2050	2190	2350	2500	2800	3000
Boiler Head to Water Outlet	C	900	1050	1150	1120	1320	1470	1620	1730	1800	1900	2180	2360
WIDTHS													
Overall	D	750	750	750	1160	1160	1160	1420	1420	1420	1420	1500	1500
External Skid Width	E	620	620	620	760	760	760	920	920	920	920	1000	1000
HEIGHTS													
Water Outlet FLG. to Ground	F	1310	1310	1310	1590	1590	1590	1980	1980	1980	1980	2100	2100
Skid I-Beam Size (IPN)	G	120	120	120	120	120	120	140	140	140	140	160	160
CONNECTIONS													
Water Return	H	3"	3"	3"	3"	3"	3"	4"	4"	4"	4"	4"	4"
Water Outlet	I	2"	2"	3"	3"	3"	3"	4"	4"	4"	4"	4"	4"
Drain	J	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1 ½"	1 ½"
Stack I.D.	K	6"	6"	1"	8"	8"	8"	10"	10"	10"	10"	10"	10"
MINIMUM BOILER ROOM CLEARANCES													
Front Clearance	--	1200	1320	1520	1570	1690	1970	2130	2300	2450	2600	3000	3200
Rear Clearance	--	700	700	700	800	800	800	1000	1000	1000	1000	1200	1200
Side Clearance	–	500	500	500	500	500	500	700	700	700	700	1000	1000
BOILER WEIGHT													
Shipping Weight (@ 10 bar)	--	890	950	1030	1420	1520	1620	2670	2790	3020	3150	3930	4140

● The measures and weights might be different from final product by less than 10%

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روبروی پالایشگاه نفت پارس، پلاک ۱۲

FAMCO
هایپرصنعت

Hot water boiler room

Reverse Chamber
Hot Water Boiler

Hot Water Steel Boiler PACKMAN PHWB is special oil/gas hot water steel boiler designed for use in installations conforming to highest global standards with a permissible overall operating pressure up to 16 bar.

The main prerogative in the design of the PACKMAN PHWB has been economy in conjunction with maximum protection of the environment. Favorable base measurements ensure that it fits into small heating installations where space is tight.

The reverse combustion chamber offers optimum conditions for complete combustion which, in conjunction with balanced thermal stress of all heating surfaces, guarantees a high degree of fuel and heat utilization.

Due to the concentric arrangement of all heating surfaces around the flame and streamlined shape of the turbulence pipes the intrinsic energy requirement is reduced to a minimum.

Scan this code To access the Pakman product selection application and select this product.

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More info about this product.

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The symmetrical construction layout means that the boiler is sufficiently elastic with heat stresses eliminated, which in combination with the advantage of easy maintenance ensures a long service life. In the cylindrical reverse combustion the returning flue gases envelop the burner flame thus ensuring complete soot-free combustion with a high CO2 content, the most important prerequisite for environmentally harmless boiler operation.
The boiler body is covered with 100 mm heat insulation mats with cladding of stainless steel sheets PACKMAN PHWB is produced in modern, sophisticated and well-equipped workshops. Careful testing ensures a top level standard of quality.
The furnace is formed with fire tubes. The flue gases are directed to the top smoke tubes where they are cooled down. Most of the medium water capacity boilers are made of this type. Because of its structure the three pass boiler is also suitable for liquid and gaseous fuels, light oil combustion

Boiler supports, skids:

The boiler body stands on supports. Most of the unit are delivered with skids; So there is no need special foundation for installation. In this case, also all the accessories necessary for operation, such as oil or gas firing equipment, combustion air fan, oil preheater, control panel or switchboard and feeding device, can be mounted on the skid.

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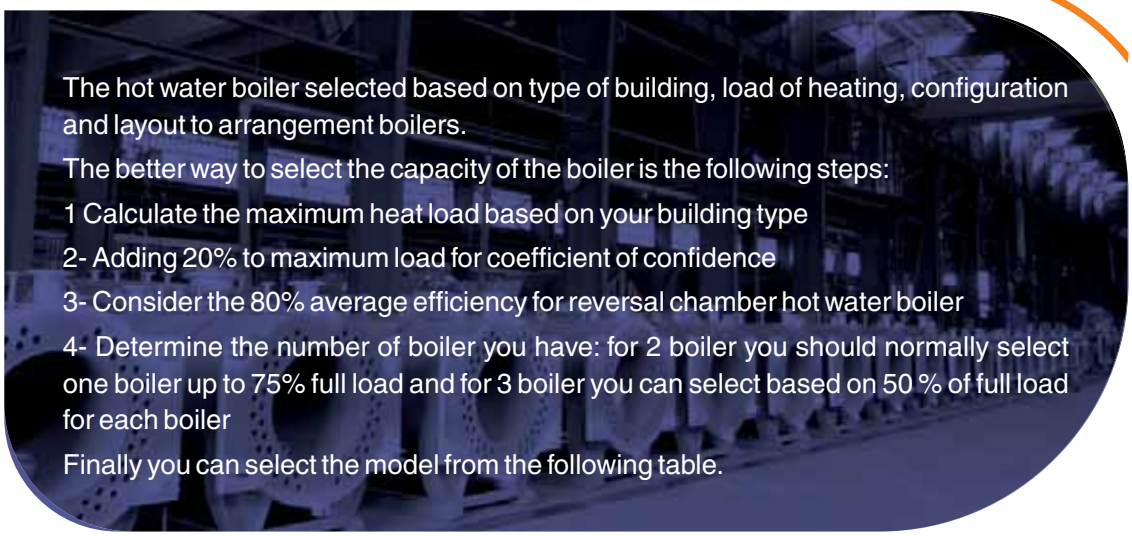
Product Capacity Calculation & Selection:



The hot water boiler selected based on type of building, load of heating, configuration and layout to arrangement boilers.

The better way to select the capacity of the boiler is the following steps:

1 Calculate the maximum heat load based on your building type

2- Adding 20% to maximum load for coefficient of confidence

3- Consider the 80% average efficiency for reversal chamber hot water boiler

4- Determine the number of boiler you have: for 2 boiler you should normally select one boiler up to 75% full load and for 3 boiler you can select based on 50 % of full load for each boiler

Finally you can select the model from the following table.

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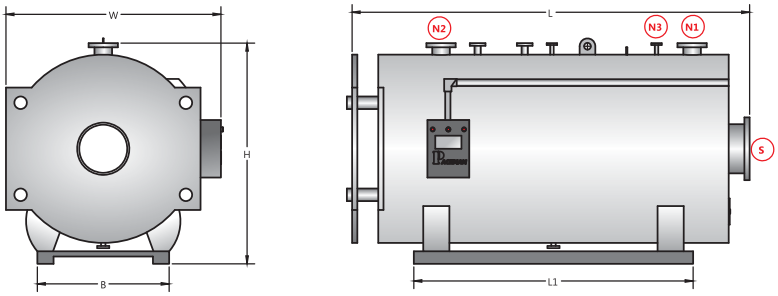

Element	Unit	Boiler model					
		PHWB-10	PHWB-15	PHWB-20	PHWB-25	PHWB-30	PHWB-40
Thermal Output	Kcal/h	100,000	150,000	200,000	250,000	300,000	400,000
Overall Length	mm	1740	2000	2030	2040	2040	2350
Boiler Total Width	mm	1050	1050	1100	1100	1200	1200
Boiler Shell Width	mm	620	620	660	660	740	740
Boiler Height	mm	1280	1280	1330	1350	1450	1450
Flow Gas Resistance	mbar	1.20	1.20	1.50	1.50	1.70	2.60
Transport Weight	Kg	700	750	800	1000	1200	1400
Operating Weight	Kg	1000	1050	1130	1360	1600	1900

Element	Unit	Boiler model					
		PHWB-50	PHWB-60	PHWB-70	PHWB-80	PHWB-90	PHWB-100
Thermal Output	Kcal/h	500,000	600,000	700,000	800,000	900,000	1,000,000
Overall Length	mm	2450	2450	2600	2730	2830	3000
Boiler Total Width	mm	1220	1320	1400	1450	1550	1670
Boiler Shell Width	mm	780	860	900	950	1000	1120
Boiler Height	mm	1500	1600	1650	1700	1830	1940
Flow Gas Resistance	mbar	3.20	3.50	3.90	4.10	4.20	4.60
Transport Weight	Kg	1600	2000	2100	2400	3000	3500
Operating Weight	Kg	2200	2750	2975	3400	4300	5200

- The measures and weights might be different from final product by less than 10%