

RAYKA

Condensing Boiler

Packman RAYKA condensing boilers work with gas or oil. These boilers have high efficiency since they use the water vapor latent heat of flues gases based on the temperature of the return water to preheated cold water entering the boiler. Water vapor and other component of combustion products are condensed which leads to energy and cost saving.



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How Packman condensing boiler works

The Boiler operation is governed by the desired temperature of hot water outlet. Using a digital, high precision temperature controller, the owner will identify the required hot water temperature. A temperature sensor located in the boiler outlet manifold continuously measures the outlet water temperature. A servomotor controlling the gas valve actuator and the air damper separately, which throttles the air/gas mixture entering the burner. For as long as the set temperature is above that of the outlet water, the boiler operates at maximum output capacity. Analogue output signals from the temperature sensor are sent to the temperature controller, which in turn sends corresponding signals to the actuator. Therefore, the appropriate volume of air/gas mixture flows into the burner, allowing for almost perfect air/gas mass, and volume ratios. As the outlet temperature approaches the set temperature, the air/gas mixture flow is gradually reduced by the servomotor (connected to the gas butterfly valve and the air damper). This results in the corresponding gradual decrease in the unit's capacity. Thus the modulating system allows for optimum continuous operation of the boiler, significantly reducing on/off cycles. The said system offers the user almost infinite modulating capacity within the boiler operating range.

Operation of all products is based on the patented radial pulsed technology. Due to the turbulent mode of heat transfer, turbulent water flow and direct heating of the heat exchanger, the overall heat transfer (thermal) efficiency of the products is in the range of 94.0% - 98.9%, depending on the return water temperature. Packman Rayka Condensing Boilers have been certified as boilers, and water heaters (open cycle heating), as well as for potable water, Water Desalination System swimming pool applications.

In the construction of these boilers, all tests are conducted in accordance with the American National Standard Institute (ANSI). In addition, all parts of the Pressure Parts are in accordance with the American Society of Mechanical Engineers (ASME). All materials used in the heat exchanger are also selected according to the requirements of the American Society of Testing Material (ASTM).



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More info about this product.

Condensing Boiler Material

Packman Boilers are fabricated with 300 series stainless steel (316L) because materials containing nickel and chromium have more solidity than 400 series.

Element	Fractional Size	Metric & Imperial Sizes
	Compositions, wt. %	
Chromium	16.0 to 18.0	17.0 to 19.0
Nickel	11.0 to 14.0	12.5 to 15.0
Molybdenum	2.00 to 3.00	2.50 to 3.00
Manganese	2.00 max	2.00 max
Silicon	0.75 max	1.00 max
Carbon	0.035 max	0.030 max
Sulfur	0.030 max	0.015 max

Capacity Range

The capacity range of Rayka Packman condensing boilers differs from 400,000 to 10,000,000 kcal / with working pressure up to 190 bar g. The stainless steel heat exchanger used in the boilers is constructed as a vertical coil based on capacity.

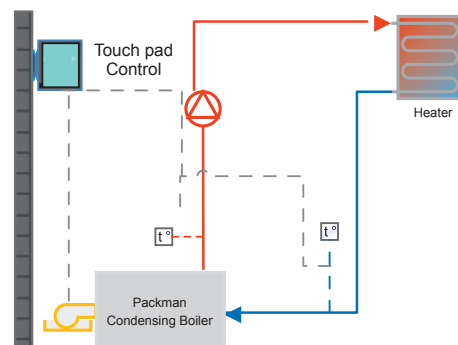
These condensing boilers can directly produce sanitary hot water because of the structure of heat exchanger and the material.

Applications

These boilers are used in schools, commercial and residential buildings, potable water direct heating, water desalination systems, swimming pools and other area which need heating system.

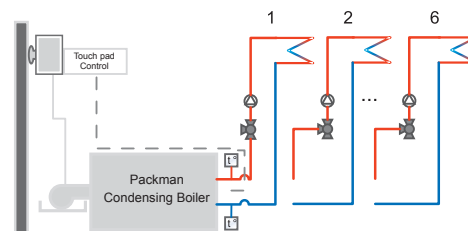
BMS connection

- Remote control ability for heating programing and set points.
- Communicating any type of protocol supported.
- Fault and status report from BMS.
- Air and gas automatic damper control.



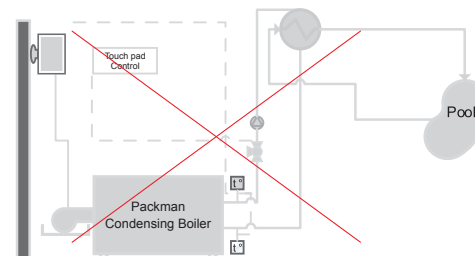
Load controlling

- Capacity range from 16% to 100% of full load.
- Adjustable hot water flow rate.
- Boiler Operation based on return water temperature direct heating.



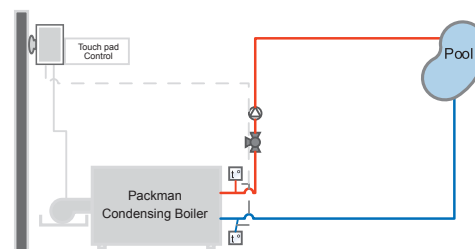
Direct Heating

- Direct water heating for pool, domestic hot water and etc.
- 5 centigrade degree water inlet is acceptable.
- 90°C temperature difference.
- Used in water desalination systems.



Packman Rayka Condensing Boiler Advantage

- A wide temperature range from 5 to 120°C
- Capacity range from 400,000 to 10,000,000 Kcal/h
- Working Pressure up to 190 bar
- No need to water treatment system for inlet water
- Special design with no fouling formation
- Direct water heating with no auxiliary heat exchanger
- Easy maintenance and commissioning
- Efficiency up to 98% HHV



- Special radial pulse burner for lowest amount of contamination
- Modular burner with capacity range from 20% to 100%
- Capability works with dual fuel burner no need to long chimney (upvc chimney accepted)
- PLC Control panel with capability to connect to the BMS
- Suitable for potable water direct heating, Water Desalination Systems, swimming pools direct heating and etc.

Condensing Boiler Efficiency

Packman's Condensing Boilers have the highest certified efficiency among condensing boilers. This high specific efficiency is the result of the combustion characteristics and the heat transfer process of the device, which leads to the condensation of water vapor. The efficiency values depend on the water temperature. The lower the input water, the greater the amount of condensation, so the higher the yield. Boilers circulate water inside the system, so the boiler water intake is the same water returning from the building, which has a higher temperature than the city's water pipeline. Given the amount of condensation, the presence of this latent heat increases the efficiency by about 11%. For example, the following graph shows the boiler efficiency variations of 500,000 kcal / h with different water temperatures. As the heat transfer equations show, if the input capacity is reduced and the heat transfer surface remains constant, the temperature transfer rate on the unit of heat exchanger will increase. So the efficiency will go up. The chart shows the increase in the amount of efficiency in low-load loads at different water temperatures.

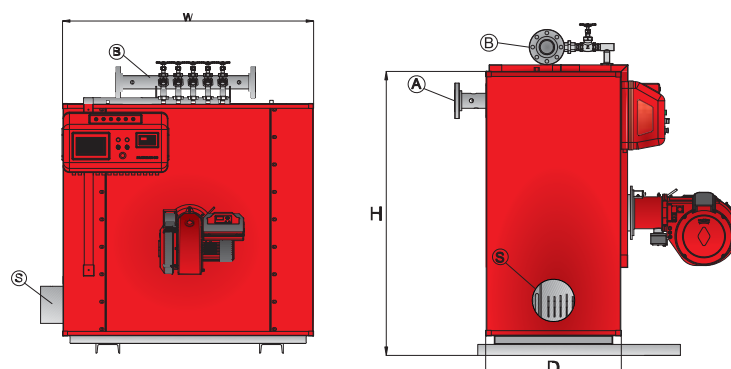
Product Capacity Calculation & Selection:

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

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

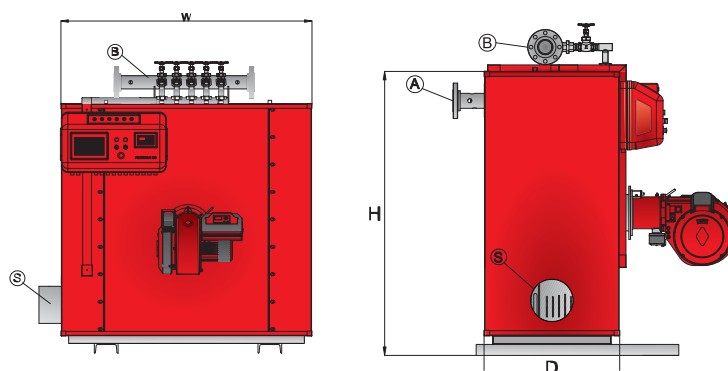
- 1- Calculate the maximum heat load based on your building type
- 2- Adding 20% to maximum load for coefficient of confidence
- 3- Consider the 95% average efficiency for condensing boiler
- 4- Determine the number of boiler you have: for 2 boilers you should normally select one boiler up to 75% full load and for 3 boiler you can select based on 50 % of full load for each boiler

Finally you can select the model from following table.



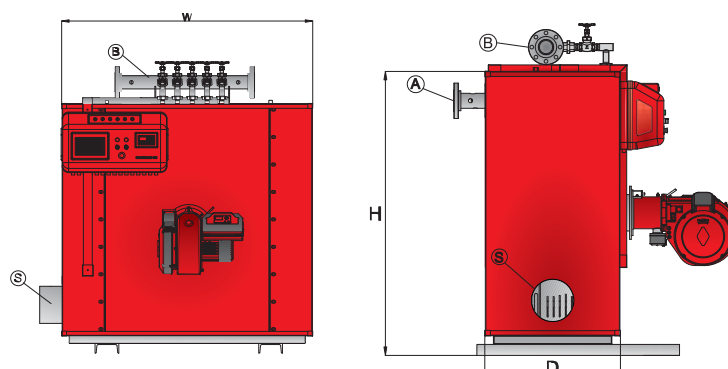
Boiler Capacity (Kcal/h)		400,000	500,000	600,000	700,000	800,000
		Boiler Model				
	Unit	PHWB-CO-400	PHWB-CO-500	PHWB-CO-600	PHWB-CO-700	PHWB-CO-800
HHV Efficiency % @ Full Load	Percent	95	95	95	95	95
HHV Efficiency % @ P	Percent	98	98	98	98	98
Type of Fuels	Type	Gas	Gas	Gas	Gas	Gas
Gas Consumption at 9,600 Kcal/m ³	m ³ / hr.	41.6-6.95	52.1-8.7	62.5-10.4	72.9-12.15	83.4-13.9
Working Pressure (bar) -	bar g.	16	16	16	16	16
(Maximum Allowable Boiler Working Pressure 190 bar)						
Design Water Temperature (°C)	°C	120	120	120	120	120
Maximum Differential Temperature (°C)	°C	100	100	100	100	100
Minimum Inlet Temperature (°C)	°C	5	5	5	5	5
Electrical Rating (ph./Hz/v)	ph./Hz/v	3/50/380	3/50/380	3/50/380	3/50/380	3/50/380
Water Content	lit	210	280	330	330	410
Recommended Water Flow Rate @ ΔT=20°F	lit/min	600	755	900	1050	1200
Gas inlet Pressure	mbar	20-35	70-139	70-139	70-139	70-139
Boiler Shell Width (W)	mm	1700	1700	1700	1700	1700
Boiler Shell Depth (D)	mm	800	800	800	800	800
Boiler Shell Height (H)	mm	1680	1680	1680	1680	1680
Overall Width (W1)	mm	1700	1700	1700	1700	1700
Overall Height /Outlet (H1)	mm	1960	1960	1960	1960	1960
Transport Weight	Kg	820	1040	1160	1160	1380
Supply & Return Connection (A,B)	in	4	4	5	5	5
Gas Connection (C)	in	1 1/2	2	2	2	2
Exhaust Gas Outlet Connection (S)	in	8	10	10	10	12
Pressure safety valve Connection (G)	in	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4
Drain Connection	in	3/4	3/4	3/4	3/4	3/4
Air Vent Connection	in	3/8	3/8	3/8	3/8	3/8

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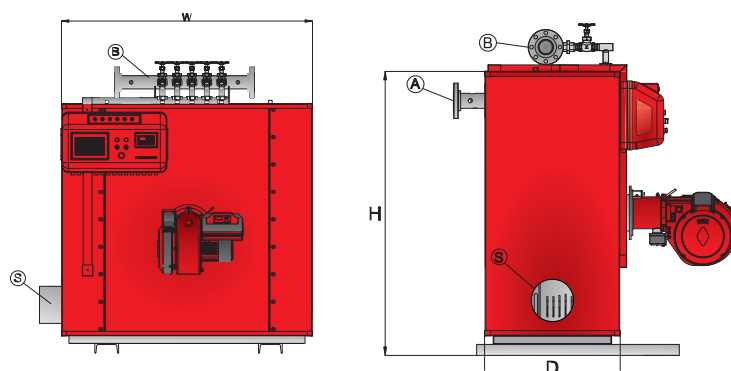
Boiler Capacity (Kcal/h)		1,000,000	1,250,000	1,500,000	1,750,000	2,000,000
		Boiler Model				
	Unit	PHWB-CO-1000	PHWB-CO-1250	PHWB-CO-1500	PHWB-CO-1750	PHWB-CO-2000
HHV Efficiency % @ Full Load	Percent	95	95	95	95	95
HHV Efficiency % @ P	Percent	98	98	98	98	98
Type of Fuels	Type	Gas	Gas	Gas	Gas	Gas
Gas Consumption at 9,600 Kcal/m ³	m ³ / hr.	104.2-17.4	130.3-21.8	156.3-26.1	182.3-30.4	208.4-34.8
Working Pressure (bar) -	bar g.	16	16	16	16	16
(Maximum Allowable Boiler Working Pressure 190 bar)						
Design Water Temperature (°C)	°C	120	120	120	120	120
Maximum Differential Temperature (°C)	°C	100	100	100	100	100
Minimum Inlet Temperature (°C)	°C	5	5	5	5	5
Electrical Rating (ph./Hz/v)	ph./Hz/v	3/50/380	3/50/380	3/50/380	3/50/380	3/50/380
Water Content	lit	480	620	740	830	990
Recommended Water Flow Rate @ΔT=20°F	lit/min	1510	1880	2250	2630	3010
Gas inlet Pressure	mbar	70-139	70-139	70-139	70-139	70-139
Boiler Shell Width (W)	mm	1700	1700	1700	2320	2320
Boiler Shell Depth (D)	mm	1150	1150	1150	1300	1300
Boiler Shell Height (H)	mm	1680	1680	1680	1800	1900
Overall Width (W1)	mm	1700	1700	1700	2320	2320
Overall Height /Outlet (H1)	mm	2100	2100	2100	2100	2200
Transport Weight	Kg	1590	1970	2280	2550	2960
Supply & Return Connection (A,B)	in	5	6	6	6	8
Gas Connection (C)	in	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
Exhaust Gas Outlet Connection (S)	in	14	14	16	16	16
Pressure safety valve Connection (G)	in	1 1/4	1 1/4	1 1/4	1 1/4	1 1/2
Drain Connection	in	3/4	3/4	3/4	3/4	1
Air Vent Connection	in	3/8	3/8	3/8	3/8	3/8

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Boiler Capacity (Kcal/h)		2,250,000	2,500,000	2,750,000	3,000,000	4,000,000
		Boiler Model				
	Unit	PHWB-CO-2250	PHWB-CO-2500	PHWB-CO-2750	PHWB-CO-3000	PHWB-CO-4000
HHV Efficiency % @ Full Load	Percent	95	95	95	95	95
HHV Efficiency % @ P	Percent	98	98	98	98	98
Type of Fuels	Type	Gas	Gas	Gas	Gas	Gas
Gas Consumption at 9,600 Kcal/m³	m³ / hr.	234.4-39.1	260.4-43.4	286.5-47.8	312.5-52.1	416.7-69.5
Working Pressure (bar) -	bar g.	16	16	16	16	16
(Maximum Allowable Boiler Working Pressure 190 bar)						
Design Water Temperature (°C)	°C	120	120	120	120	120
Maximum Differential Temperature (°C)	°C	100	100	100	100	100
Minimum Inlet Temperature (°C)	°C	5	5	5	5	5
Electrical Rating (ph./Hz/v)	ph./Hz/v	3/50/380	3/50/380	3/50/380	3/50/380	3/50/380
Water Content	lit	1090	1240	1340	1470	2013
Recommended Water Flow Rate @ΔT=20°F	lit/min	3380	3760	4135	4510	6010
Gas inlet Pressure	mbar	70-139	70-139	70-139	70-139	70-139
Boiler Shell Width (W)	mm	2500	2500	2510	2510	2870
Boiler Shell Depth (D)	mm	1530	1530	1600	1600	1700
Boiler Shell Height (H)	mm	2350	2350	2560	2560	2870
Overall Width (W1)	mm	2500	2500	2500	2500	2500
Overall Height /Outlet (H1)	mm	2800	2800	2800	2800	3000
Transport Weight	Kg	3220	3640	3920	4230	5700
Supply & Return Connection (A,B)	in	8	8	8	8	10
Gas Connection (C)	in	3	3	3	3	3
Exhaust Gas Outlet Connection (S)	in	16	20	20	20	24
Pressure safety valve Connection (G)	in	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
Drain Connection	in	1	1	1	1	1
Air Vent Connection	in	3/8	3/8	3/8	3/8	3/8

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Boiler Capacity (Kcal/h)		5,000,000	6,000,000	7,000,000	8,000,000	10,000,000
		Boiler Model				
	Unit	PHWB-CO-5000	PHWB-CO-6000	PHWB-CO-7000	PHWB-CO-8000	PHWB-CO-10000
HHV Efficiency % @ Full Load	Percent	97	97	97	97	97
HHV Efficiency % @ P	Percent	98.9	98.9	98.9	98.9	98.9
Type of Fuels	Type	Gas	Gas	Gas	Gas	Gas
Gas Consumption at 9,600 Kcal/m ³	m ³ / hr.	520.83-89.8	625-104.16	729.166-121.5	833.3-138.8	1041.6-173.6
Working Pressure (bar) -	bar g.	16	16	16	16	16
(Maximum Allowable Boiler Working Pressure 190 bar)						
Design Water Temperature (°C)	°C	120	120	120	120	120
Maximum Differential Temperature (°C)	°C	100	100	100	100	100
Minimum Inlet Temperature (°C)	°C	5	5	5	5	5
Electrical Rating (ph./Hz/v)	ph./Hz/v	3/50/380	3/50/380	3/50/380	3/50/380	3/50/380
Water Content	lit	2500	3100	3500	4100	5000
Recommended Water Flow Rate @ΔT=20°F	lit/min	7511	9013	10515	12017	15022
Gas inlet Pressure	mbar	70-139	70-139	70-139	70-139	70-139
Boiler Shell Width (W)	mm	3000	3100	3200	3300	3400
Boiler Shell Depth (D)	mm	1800	2000	2000	2500	3000
Boiler Shell Height (H)	mm	3000	3100	3200	3300	3400
Overall Width (W1)	mm	3000	3100	3200	3300	3400
Overall Height /Outlet (H1)	mm	3400	3500	3600	3700	3800
Transport Weight	Kg	6000	6800	7200	8000	9900
Supply & Return Connection (A,B)	in	10	10	12	12	12
Gas Connection (C)	in	3	3	3	3	3
Exhaust Gas Outlet Connection (S)	in	36	38	40	40	44
Pressure safety valve Connection (G)	in	3	3	3	3	4
Drain Connection	in	2	2	2	2	2
Air Vent Connection	in	1	1	1	1	1

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OPTIMA

Condensing Boiler

The condensing technology of boilers and water heaters features an advanced high efficiency and convenient that results in a proper installation, operation and life time cost advantages for systems operating from 100 to 300 KW. For applications greater the 300 kW, you can easily chain multiple units together.

Premix burners with a fiber mesh make the PACKMAN Condensing Boilers ideal for "green" operation. The Premix burner technology help to achieve emission levels less than 20 ppm NOx.



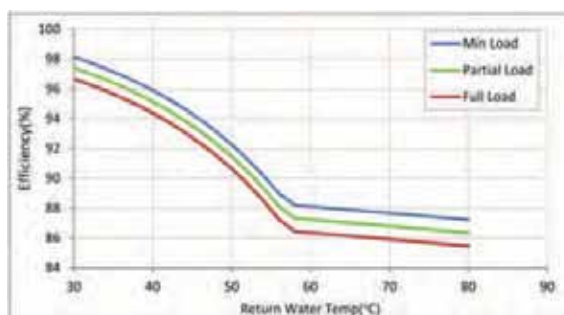
OPTIMA Series

The boiler optima series and water heaters are that of the packman common ones which meets the market demand for hot water solutions with less installation and lifecycle costs while providing the best uptime reliability. Because of high efficiency, the optima series operation covers a wide range of facilities as bellow:

- Multi-family/Apartments
- Education
- Hotels
- Medical Centers/Nursing Homes
- Office Buildings

Key Features:

- Available in five capacities from 100 to 350 kW
- Efficiencies of up to 98%
- Advanced modulation technology
- Natural gas fuel
- Turndown ratio up to 5:1
- Whisper-quiet operation, even at full fire
- Small footprint
- chain multiple units for applications over 300 kW
- Direct/conventional vent with CPVC, Polypropylene or AL29-4C materials



The high performance with a compact and flexible design of the optima series results in a perfect use for hot water solution systems requiring 100 to 300 kw and above. Instant installation and cost effective accessories eliminate the need of special rigging or changing the system to adopt for a custom mechanical rooms makes the optima series well suited for retrofits.

In conclusion the main advantages of optima series are easy installation , having high efficiency which saves the space needed and reduces energy consumption to cause a significant short and long term saving for all kind of buildings. and lowers energy use to create significant short- and long-term savings for all kind of buildings.



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More info about this product.

The modular design of optima series results in a proper installation operation and reliability which makes it to be competitive with other boiler and water heater classes. Designing a hydronic system with an OPTIMA Series unit delivers advantages such as:

Lower Costs:

Installation, operating, and lifetime costs are all reduced due to the modular design that maximizes efficiency and operation.

Higher Uptime Reliability:

The modular design also creates a level of redundancy and reliability from a single OPTIMA Series boiler or water heater that is typically only found in multi-unit systems.

Installation Flexibility:

A wide variety of venting options allows the OPTIMA Series to be easily integrated into any system, whether it is a retrofit or a new construction.

Space Savings:

Its compact footprint allows the OPTIMA Series to be installed in small mechanical rooms.

Easy Access:

Simple side accessibility makes it more efficient for technicians to conduct scheduled service and maintenance on the units, which in turn saves time and reduces labor costs.

Maintaining the PACKMAN heritage, the OPTIMA Series delivers high operating efficiency up to 98%. By achieving the highest possible seasonal efficiencies, the OPTIMA Series creates short-term and lifecycle energy savings. Best-in-class performance is achieved by using superior design approach that incorporates:

High-quality materials:

At the heart of the boiler is a unique heat exchanger designed with oval-section stainless steel tubes. The heat exchanger is constructed out of 316L stainless steel tubes for high reliability and long life.

Advanced Modulation and Condensing Technologies:

The OPTIMA Series continues the decades-long trademark of PACKMAN solutions features fully modulating and condensing technologies. High modulation means the OPTIMA Series matches the exact load needed, minimize cycling, eliminate over-firing, and achieve tight temperature control.

Premix Burner:

The OPTIMA Series contain a total premix combustion unit, with variable-speed fan. The burner occupies a very little vertical space, allowing the entire length of the heat exchanger to be exploited and bringing obvious benefits regarding condensation and stratification in the boiler.

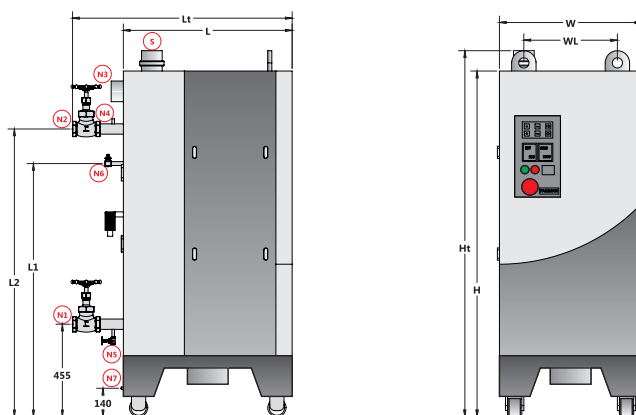
High Level Design: PACKMAN condensing boilers are designed using high level techniques such as computational fluid dynamics (CFD) for high thermal efficiency and finite element (FE) analysis to ensure long life.

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 95% average efficiency for condensing 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.
- 5- Finally you can select the model from the following table.



Element		Boiler Model				
	Unit	OPTIMA 100	OPTIMA 150	OPTIMA 200	OPTIMA 250	OPTIMA 300
L	mm	830	900	1000	1060	1110
Lt	mm	1080	1150	1270	1350	1400
W	mm	700	770	820	880	930
WL	mm	480	550	600	660	695
H	mm	1700	1750	1875	1875	2000
Ht	mm	1800	1850	1975	1975	2100
L1	mm	1245	1295	1320	1320	1445
L2	mm	1415	1465	1540	1530	1655
Water content	Liter	165	210	250	300	350
Weight(dry)	Kg	475	560	670	760	850
Weight(Wet)	Kg	640	770	920	1060	1200

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Item		Boiler Model				
Unit		OPTIMA 100	OPTIMA 150	OPTIMA 200	OPTIMA 250	OPTIMA 300
Min heat input	KW	0	30	40	50	60
Man heat input	KW	100	150	200	250	300
Min gas consumption	m3/hr	1.86	2.79	3.72	4.65	5.58
Max gas consumption	m3/hr	9.3	13.95	18.6	23.25	27.9
Efficiency	30/50	%	97	97	97	97
	60/80	%	86	86	86	86
Gas Connection	inch	3/4	3/4	1	1	1
Min gas pressure	mbar	18				
Max gas pressure	mbar	60		100		
Max working pressure	bar	6				
Water temp. range	oC	40-85				
Electric supply		220 VAC/ 50Hz/ 1 Ph				
Max condensate	Lit/hr	11.2	16.8	22.4	28.0	33.6
Min water flow	Lit/s	1.5	2.25	3.0	3.75	4.5
Max water flow	Lit/s	5	7.5	10	12.5	15
Inlet/outlet connections	inch	2	2	2 1/12	3	3
Vent/Air intake	inch	4	4	6	6	6
Vent material	cm	CPVC / PP/ AL29-4C				
Condensate discharge	inch	1/2	1/2	1/2	1/2	1/2
Condensate PH	-			4-4.5		
Drain valve	inch	1/2	1/2	3/4	3/4	3/4
Safety valve	inch	1/2	1/2	3/4	3/4	3/4

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