

Knowledge
Based

Since 1975



PACKMAN
Industrial Group



Three Pass Wetback Steam Boiler
powered by PACKMAN industrial group



Three Pass Wetback Steam Boiler



Product Description

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.
- With recent techniques it is possible to reduce losses and energy consumption, besides the more economical operation is achieved by optimum controllability.

Three-Pass Boiler

The three-pass boiler is robust and economical. The furnace is formed by the fire tube. The flue gases are directed through topped smoke tubes where they are cooled down. As it has proved to be especially economical to lead the flue gases through three passes most of the large water space boilers built today belong to this type-hence the name “three-pass boilers”.

Because of its constructional design the three-pass boiler is especially suitable for the combustion of liquid or gaseous fuels. It can, however, as well be used for solid fuels. Coal or wood performances.

- Fire tube: In the three-pass boiler the fire tube forms the combustion chamber. The chosen diameter makes sure that an unobjectionable flame can develop and a complete burnout is guaranteed. The decision whether



plane or spiral fire tubes are to be used depends on the diameter and the working pressure. 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 is based on supports. Most of the unit are delivered on skids by that special foundations for the installation are not required. In this case all accessories which are necessary for operation, such as oil or gas firing equipment, combustion air fan, oil pre heater, control panel or switchboard and feeding device, can be mounted on the skid, too.

- **Boiler Body, Insulation**

The cylindrical boiler body forms the water and the steam space 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 supervision of 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 considers the recommendation of ascending flue passes in order to prevent the formation of residual or lingering gases.

- **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. At PACKMAN double outside the boiler body. The exterior reversing chamber is formed of tightly welded tube walls; it is water cooled (Wet Back) and absolutely gas tight. At this type, too, 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

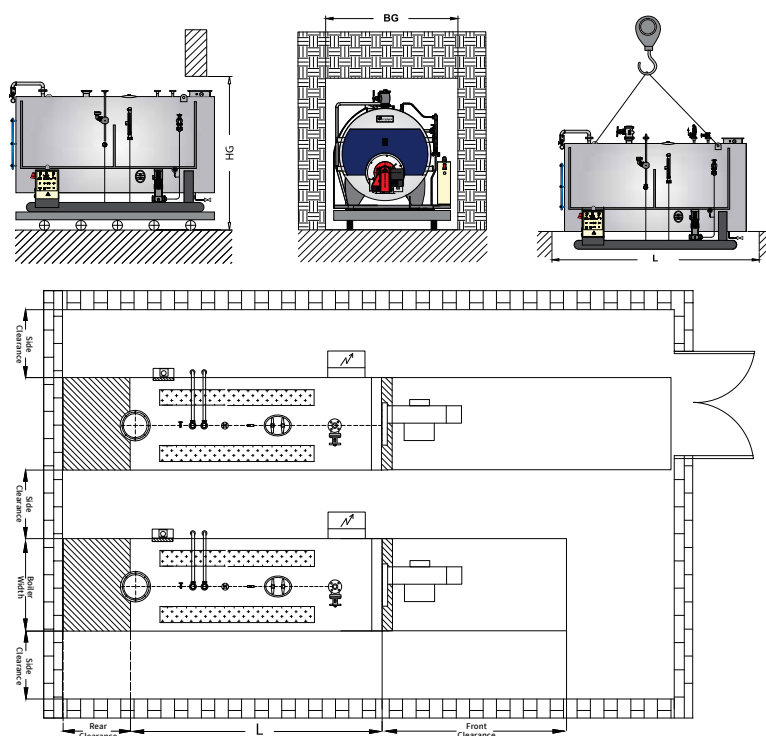
Inside of a tightly welded and insulated chamber made of steel sheets the flue gases are led from the second to the third boiler pass. The reversing chamber is equipped with large doors, allowing free access to the smoke tubes and easy maintenance and cleaning. High quality tightening material guarantees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

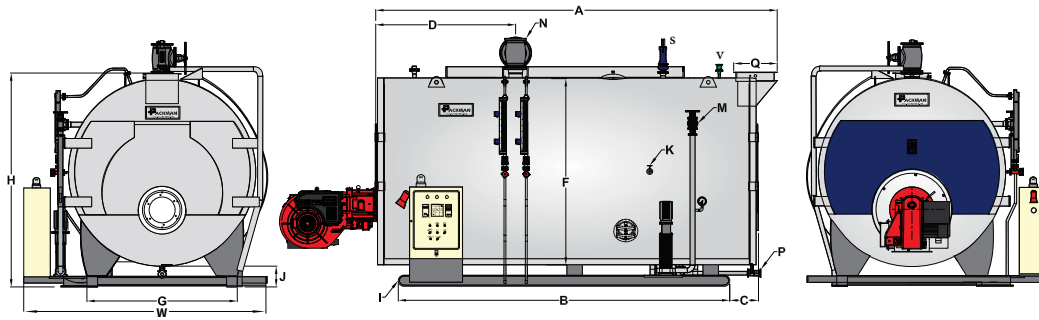
Product Capacity Calculation & Selection

The Steam boiler selected based on maximum require capacity and type of process, The better way to select the capacity and pressure of the boiler is the following steps:

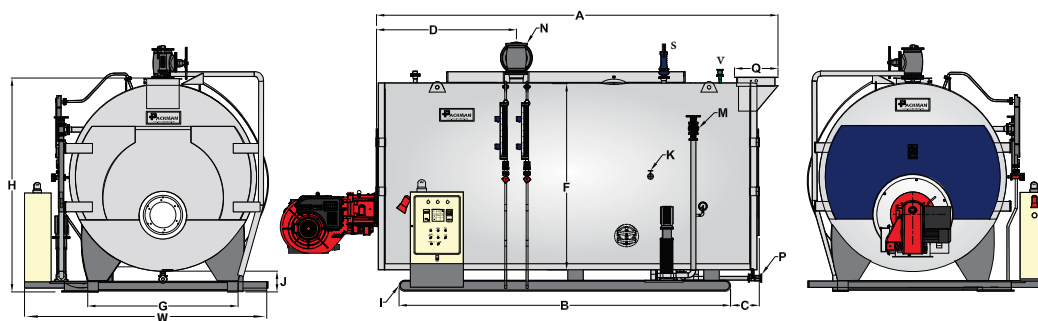
- 1- Calculate the maximum heat load based on your process.
- 2- Adding 20% to maximum load for coefficient of confidence.
- 3- Consider the 85% average efficiency for three pass steam boiler.
- 4- Calculate pressure based on your project and distance between boiler and consumer.
- 5- Determine the number of boiler you have: it is better you choose number of boiler for 100% of full load

Finally you can select the model from the following table.

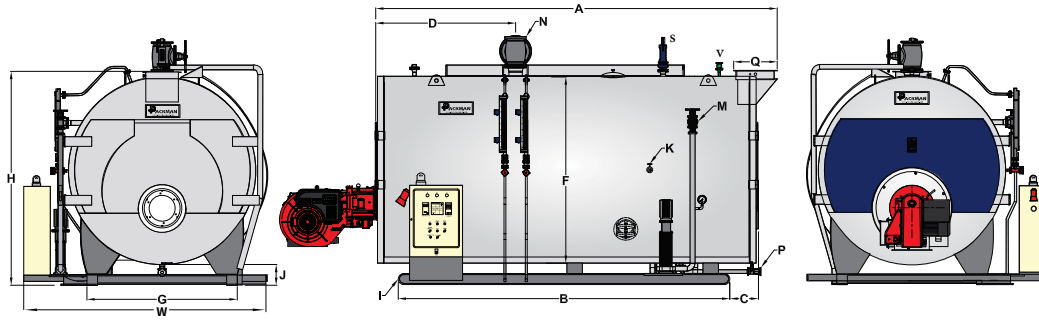




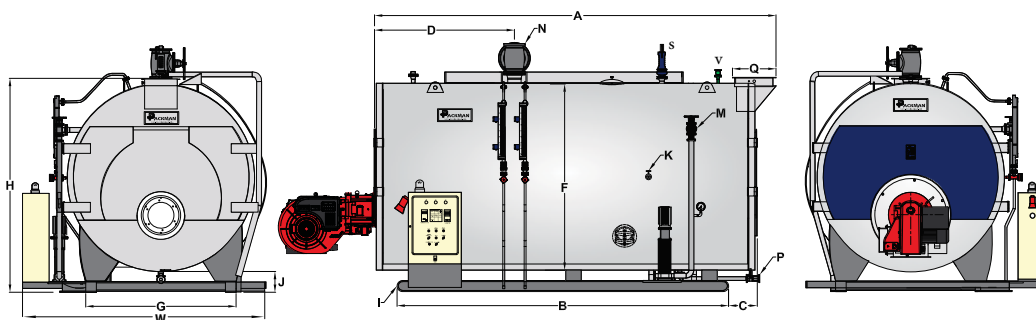
Model	Unit	PSBHN-350	PSBHN-500	PSBHN-700	PSBHN-800
Technical Data					
Thermal Capacity	kw	350	500	700	800
Steam Output	kg/hr	500	750	1000	1200
Heating Surface	m ²	16	17.5	25.7	26.8
Working Pressure	bar	Up to 30 bar			
Pressure Drop in Combustion Chamber	mbar	2.2	3.5	2.5	3.8
Design Standard	-	BS/EN 12953			
Max Gas Consumption @Sea Level	m ³ /hr	35	50	70	80
Max Fuel Oil Consumption @Sea Level	liter/hr	29	42	58.5	67
Max Heavy Fuel Oil Consumption @Sea Level	liter/hr	25	36	50	57
Connection Size @ 10 Bar Working Pressure					
Steam Outlet (N)	in	2	2	3	3
Safety Valve (S)	in	1	1	1 1/2	1 1/2
Sampling (K)	in	1/2	1/2	1/2	1/2
Feeding Valve (M)	in	1	1	1 1/4	1 1/4
Venting Valve (V)	in	1	1	1	1
Drainage Valve (P)	in	1 1/4	1 1/4	1 1/2	1 1/2
Stack I.D. (Q)	in	8	10	12	12
Boiler Dimension					
Lengths (A)	mm	2750	3200	3400	3500
Boiler Diameter (F)	mm	1440	1440	1560	1560
Width (W)	mm	1900	1900	2100	2100
Height (H)	mm	1850	1850	1950	1950
Min Front Clearance	mm	2400	2800	3000	3100
Min Rear Clearance	mm	1000	1000	1000	1000
Min Side Clearance	mm	700	700	900	900
Min Boiler Room Length	mm	6500	7000	7300	7500
Weight					
Shipping Weight @ 10 bar Working Pressure	kg	2650	3000	3580	3700



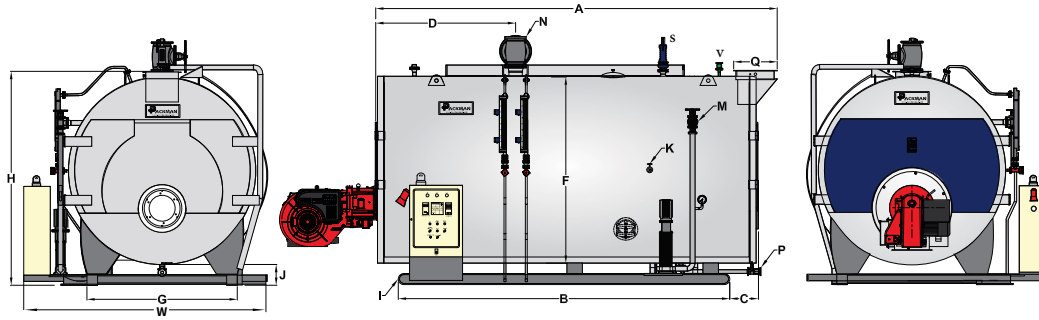
Model	Unit	PSBHN-1000	PSBHN-1250	PSBHN-1500	PSBHN-1750
Technical Data					
Thermal Capacity	kW	1,000	1,250	1,500	1,750
Steam Output	kg/hr	1,500	2,000	2,500	2,800
Heating Surface	m ²	30.2	34.2	44	48.3
Working Pressure	bar	up to 30 bar			
Pressure Drop in Combustion Chamber	mbar	3.92	5.88	4.12	6.05
Design Standard	-	BS/EN 12953			
Max Gas Consumption @Sea Level	m ³ /hr	100	125	150	175
Max Fuel Oil Consumption @Sea Level	liter/hr	83	104	125	146
Max Heavy Fuel Oil Consumption @Sea Level	liter/hr	71	89	107	125
Connection Size @ 10 Bar Working Pressure					
Steam Outlet (N)	in	3	3	3	3
Safety Valve (S)	in	1	1	1 1/2	1 1/2
Sampling (K)	in	1/2	1/2	1/2	1/2
Feeding Valve (M)	in	1	1	1 1/2	1 1/2
Venting Valve (V)	in	3/4	3/4	3/4	3/4
Drainage Valve (P)	in	1 1/4	1 1/2	1 1/2	1 1/2
Stack I.D. (Q)	in	14	14	16	16
Boiler Dimension					
Lengths (A)	mm	3580	3880	4000	4300
Boiler Diameter (F)	mm	1580	1580	1800	1800
Width (W)	mm	2020	2020	2320	2320
Height (H)	mm	2000	2000	2250	2250
Min Front Clearance	mm	3500	3700	3700	4000
Min Rear Clearance	mm	1000	1000	1000	1000
Min Side Clearance	mm	700	700	900	900
Min Boiler Room Length	mm	8500	8700	9000	9500
Weight					
Shipping Weight @ 10 bar Working Pressure	kg	4250	4700	5600	6300



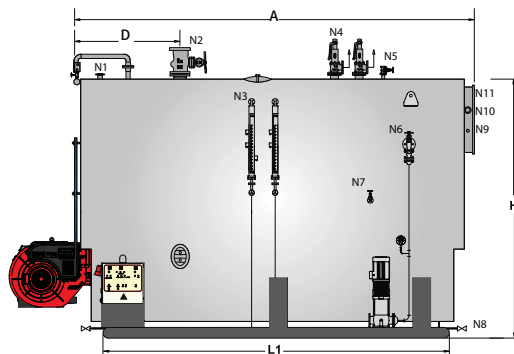
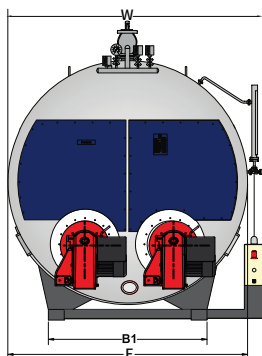
Model	Unit	PSBHN-2000	PSBHN-2500	PSBHN-3000	PSBHN-3500
Technical Data					
Thermal Capacity	kw	2,000	2,500	3,000	3,500
Steam Output	kg/hr	3,000	4,000	4,500	5,000
Heating Surface	m ²	75	82	100	110
Working Pressure	bar	up to 30 bar			
Pressure Drop in Combustion Chamber	mbar	4.17	6.7	5.13	6.3
Design Standard	-	BS/EN 12953			
Max Gas Consumption @Sea Level	m ³ /hr	200	250	300	350
Max Fuel Oil Consumption @Sea Level	liter/hr	167	208	250	292
Max Heavy Fuel Oil Consumption @Sea Level	liter/hr	143	179	214	250
Connection Size @ 10 Bar Working Pressure					
Steam Outlet (N)	in	4	5	6	6
Safety Valve (S)	in	1 1/2	1 1/2	2	2
Sampling (K)	in	1/2	1/2	1/2	1/2
Feeding Valve (M)	in	2	2	2	2
Venting Valve (V)	in	1	1	1	1
Drainage Valve (P)	in	1 1/2	1 1/2	1 1/2	2
Stack I.D. (Q)	in	16	16	20	20
Boiler Dimension					
Lengths (A)	mm	4790	5230	5250	5480
Boiler Diameter (F)	mm	2025	2025	2225	2225
Width (W)	mm	2600	2600	2810	2810
Height (H)	mm	2480	2480	2690	2690
Min Front Clearance	mm	4000	4300	4300	4500
Min Rear Clearance	mm	1000	1000	1100	1100
Min Side Clearance	mm	1000	1000	1000	1200
Min Boiler Room Length	mm	9700	10000	10500	10800
Weight					
Shipping Weight @ 10 bar Working Pressure	kg	8730	9480	10920	11070



Model	Unit	PS-BHN-4000	PS-BHN-5000	PS-BHN-6000	PS-BHN-7000
Technical Data					
Thermal Capacity	kw	4,000	5,000	6,000	7,000
Steam Output	kg/hr	6,000	8,000	10,000	11,600
Heating Surface	m ²	130	150	183	220
Working Pressure	bar	up to 30 bar			
Pressure Drop in Combustion Chamber	mbar	5.89	6.5	6.8	7.5
Design Standard	-	BS/EN 12953			
Max Gas Consumption @Sea Level	m ³ /hr	400	500	600	700
Max Fuel Oil Consumption @Sea Level	liter/hr	333	417	500	583
Max Heavy Fuel Oil Consumption @ Sea Level	liter/hr	286	357	429	500
Connection Size @ 10 Bar Working Pressure					
Steam Outlet (N)	in	6	6	6	8
Safety Valve (S)	in	2	2	2 1/2	2 1/2
Sampling (K)	in	1/2	1/2	1/2	1/2
Feeding Valve (M)	in	2	2 1/2	2 1/2	2 1/2
Venting Valve (V)	in	1	1	1	1
Drainage Valve (P)	in	2	2	2	2
Stack I.D. (Q)	in	20	24	24	24
Boiler Dimension					
Lengths (A)	mm	5480	5640	5970	6180
Boiler Diameter (F)	mm	2400	2570	2730	2880
Width (W)	mm	3100	3250	3500	3700
Height (H)	mm	2870	3030	3210	3350
Min Front Clearance	mm	4500	4500	4900	5100
Min Rear Clearance	mm	1200	1300	1400	1500
Min Side Clearance	mm	1200	1200	1300	1300
Min Boiler Room Length	mm	11100	11350	12190	12500
Weight					
Shipping Weight @ 10 bar Working Pressure	kg	13760	15250	18090	21310



Model	Unit	PSBHN-8000	PSBHN-9000	PSBHN-10000
Technical Data				
Thermal Capacity	kw	8,000	9,000	10,000
Steam Output	kg/hr	12,500	14,000	15,500
Heating Surface	m ²	260	290	330
Working Pressure	bar	up to 30 bar		
Pressure Drop in Combustion Chamber	mbar	7.8	8.1	8.5
Design Standard	-	BS/EN 12953		
Max Gas Consumption @Sea Level	m ³ /hr	800	900	1,000
Max Fuel Oil Consumption @Sea Level	liter/hr	667	750	833
Max Heavy Fuel Oil Consumption @Sea Level	liter/hr	571	643	714
Connection Size @ 10 Bar Working Pressure				
Steam Outlet (N)	in	8	8	10
Safety Valve (S)	in	2 1/2	3	3
Sampling (K)	in	1/2	1/2	1/2
Feeding Valve (M)	in	3	3	4
Venting Valve (V)	in	1	1	1
Drainage Valve (P)	in	2	2	2
Stack I.D. (Q)	in	24	30	30
Boiler Dimension				
Lengths (A)	mm	6380	6680	7100
Boiler Diameter (F)	mm	3050	3330	3530
Width (W)	mm	3900	4000	4500
Height (H)	mm	3530	3740	3950
Min Front Clearance	mm	5300	5500	5800
Min Rear Clearance	mm	1500	2000	1800
Min Side Clearance	mm	1400	1500	1700
Min Boiler Room Length	mm	13000	14000	14500
Weight				
Shipping Weight @ 10 bar Working Pressure	kg	23910	28500	33200



Model	Unit	PSBHN-12000	PSBHN-14000	PSBHN-15000	PSBHN-16000	PSBHN-18000	PSBHN-20000
Technical Data							
Thermal Capacity	kw	12,000	14,000	15,000	16,000	18,000	20,000
Steam Output	kg/hr	18,000	21,000	22,500	24,000	27,000	30,000
Heating Surface	m ²	400	467	500	533	600	667
Working Pressure	bar	up to 30 bar					
Pressure Drop in Combustion Chamber	mbar	9.5	10.5	11.5	12.5	13.5	14.5
Design Standard	-	BS/EN 12953					
Max Gas Consumption @Sea Level	m ³ /hr	1,200	1,400	1,500	1,600	1,800	2,000
Max Fuel Oil Consumption @Sea Level	liter/hr	1,117	1,303	1,397	1,490	1,676	1,862
Max Heavy Fuel Oil Consumption @Sea Level	liter/hr	1,054	1,229	1,317	1,405	1,580	1,756
Connection Size @ 10 Bar Working Pressure							
Steam Outlet (N2)	in	10	10	12	12	12	12
Safety Valve (N4)	in	4	4	4	4	5	5
Sampling (N7)	in	3/4	3/4	3/4	3/4	3/4	3/4
Feeding Valve (N6)	in	4	4	4	4	5	5
Venting Valve (N5)	in	1	1	1	1	1	1
Drainage Valve (N8)	in	2	2	2 1/2	2 1/2	2 1/2	2 1/2
Stack I.D. (N11)	in	30	32	34	38	38	40
Boiler Dimension							
Lengths (A)	mm	7400	7400	7700	8200	8200	8500
Boiler Diameter (F)	mm	3700	3800	3950	4050	4250	4500
Width (W)	mm	4200	4200	4300	4350	4500	4850
Height (H)	mm	4150	4250	4400	4500	4700	4800
Min Front Clearance	mm	6100	6100	6400	6800	6800	7100
Min Rear Clearance	mm	2000	2000	2000	2000	2500	2500
Min Side Clearance	mm	1700	1700	1700	2000	2000	2000
Min Boiler Room Length	mm	15500	15500	16100	17000	17500	18100
Weight							
Shipping Weight @ 10 bar Working Pressure	kg	36,000	39,000	44,000	47,000	54,000	60,000

PACKMAN GROUP

History

The Packman Company was founded in February 1975, and was soon afterwards registered in companies Registration Office. In early years the Packman construction and service branch focused on building installations. Different mega power plants were built by cooperating with Brown Boveri and Asseck companies in 1976.

The company started its official activities in construction of High-Pressure Vessels such as Hot-Water Boilers, Steam Boilers, Storage Tanks, Softeners and Heat Exchangers from 1984.

Packman Company is one of the first companies which supplied the high quality and standard hot water boilers to the customers.

Packman has exported its products to countries such as Uzbekistan, United Arab Emirates and other countries in the Middle East. It is one of the largest producers of hot-water and steam boilers in the Middle East.

Now we are proud to announce that the Packman industrial group has five major sub-brands that have product titles in all field of HVAC equipment and engineering services, and we do not know this success except with the help and support of our customers.

1. Construction Services Industry Association
2. Industry Association
3. Construction Companies' Syndicate
4. Technical Department Association
5. Mechanical Engineering Association
6. Engineering Standard Association

Departements:

Sales Deps:

- ⌒ Power Plant & Petrochemical
- ⌒ Industrial
- ⌒ Hospitality Service
- ⌒ Commercial & Residential
- ⌒ Sport Complex & Pool

Technical Deps:

- ≡ Manufacturing R&D
- ≡ Innovation Center
- ≡ EPC Execute Unit
- ≡ Product Develop Unit
- ≡ Sales Engineering Dep.

Others:

- ≈ After Sales Service
- ≈ Project Control
- ≈ Financial Office
- ≈ Commercial Office
- ≈ Marketing Department



PACKMAN GROUP Brands



PACKMAN
Industrial Group

Designer&manufacturer
of Condensing, Hot
Water, Steam, Hot Oil &
Waste Heat Boilers, Heat
Exchangers, Autoclave
Pressure & Storage
Vessels & etc



GREENMAN
Green mindset, green future

Engineering &
Designing Commercial
Greenhouse Plant, CO2
Dosing System, Flue
gas Condenser &
Special HVAC Systems,
Sustainable Agriculture
& etc



ROMAN
Water solution

Designer&manufacturer
Reverse Osmosis Plant &
Package, Water
Treatment, Softener &
Filters and Chemical
Dosing Systems & etc



RAADMAN
a look to the future

Designer&manufacturer
of Industrial Mono & Dual
Block Gas, LPG, Light &
Heavy Oil Burners,
Premixed & Postmixed
Burners, Watertube
burners, Process burners,
Special application
burners & Combustion
Solutions & etc



CHILLMAN
Coolest hvac around

Designer&manufacturer
of Air & Water Cooled
Chillers, Air Handling
Units, Fancoil, HVAC
Equipment, Cold
Storage Room & etc



1. Isfahan Factory



2. Vilashahr Factory



3. Parand Factory



4. Parand (2) Factory



5. Bonyad Factory

SOME OF Certificates are



Knowledge Based



PACKMAN



GREENMAN



ROMAN



RAADMAN



CHILLMAN

+9821 42 362

www.packmangroup.com

No 14, 10th Alley, Beihaghi St., Argentina Sq., Tehran-Iran