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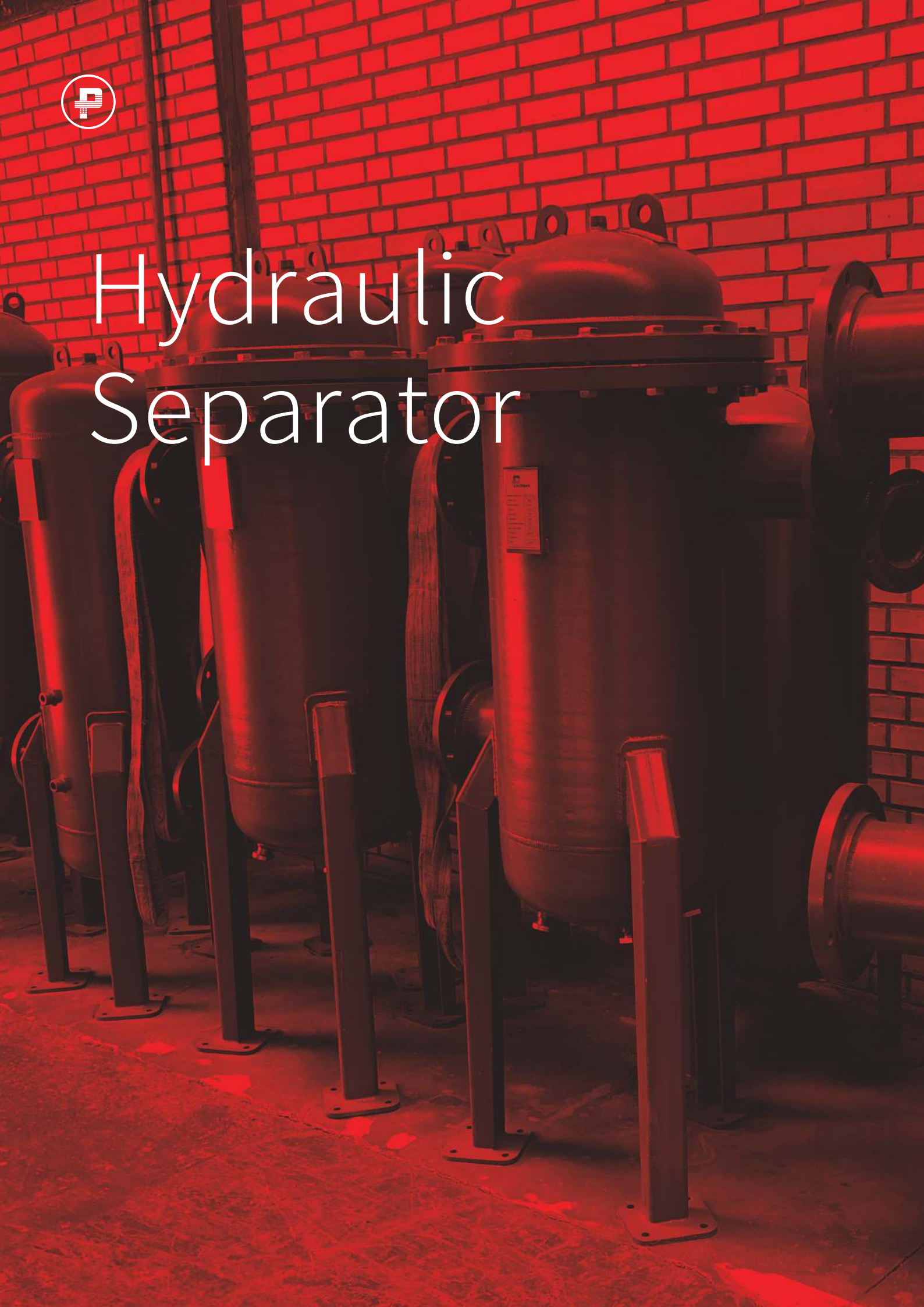


**PACKMAN**  
Industrial Group

 Hydraulic Separator  
powered by PACKMAN industrial group



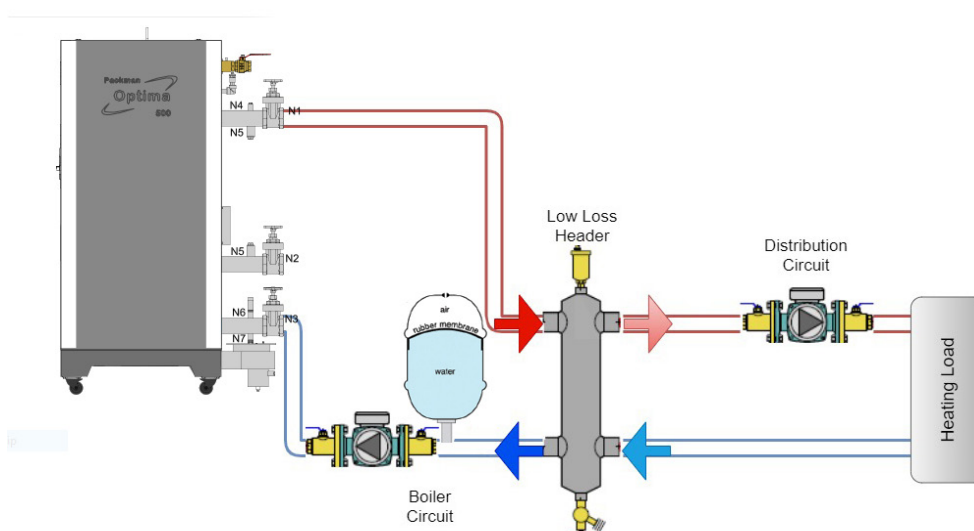
# Hydraulic Separator



## Product Description

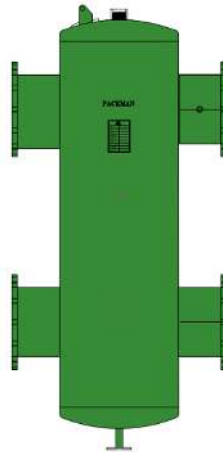
Using a Hydraulic Separator makes the water circulation path in the boiler (primary circuit) and circulation path on the consumer side (secondary circuit) separated hydraulically. Finally, this condition causes stability in the system and also creates a hydraulic structure that can play an influential role to release the air trapped in the design and to remove any debris collected at the bottom of the vessel.

In fact, for the proper operation of the boiler, to ventilate and prevent thermal load fluctuations of the system is recommended to use the method of the primary and secondary circuits with Hydraulic Separators in the design of systems.



In order to prevent noise and corrosion in the body and nozzles, the fluid velocity must be controlled.

Also, the low velocity of the fluid in the Hydraulic Separator, it makes possible that the accumulation of sediments in the lower part, which is why the Hydraulic Separator should be vertical and have a drain valve.

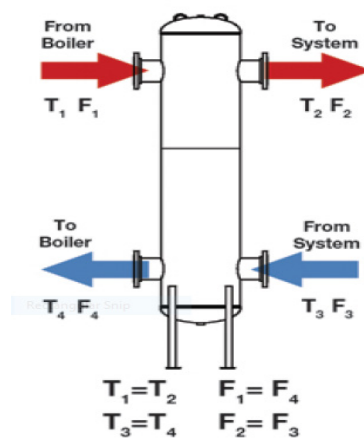


| Specifications of Valves And Fittings |  |
|---------------------------------------|--|
| Equip                                 | Specification  |
| Pressure Gauge                        | Filling with Glycerin Diameter=10 cm,<br>Nominal Pressure Range: 0-10 bar & 0-20 bar |
| Temperature Transmitter               | Operating Temperature: 0-100 °C<br>4-20 mA<br>Sensor PT100                           |

Based on the functional conditions of the consumer side and the boiler side, it may be mentioned in three modes as below:

### 1-Equal Flow

Flow Rate of Boiler and system (consumer Side) is equal.

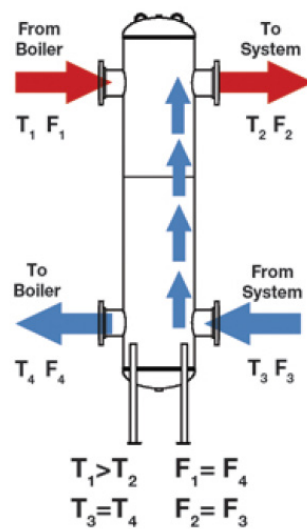


### 2- Greater Secondary Flow

In this case, the flow rate on the consumer side is greater than the flow rate



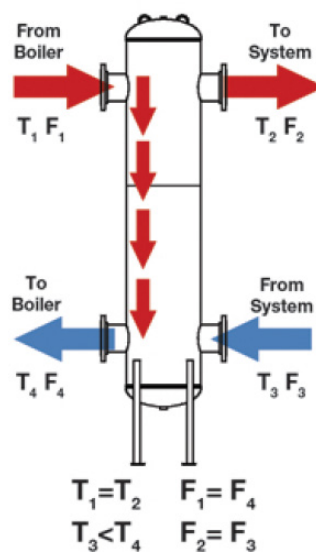
on the boiler side. In fact, in this case, the temperature of the return water from the system is lower and this temperature is mixed in the Hydraulic Separator body and as a result, the temperature of the water entering the system decreases.



### 3- Greater Primary Flow

In this case, the flow rate on the consumer side is lower than the flow rate on the boiler side.

Actually, System demand is less than boiler output, and in the Hydraulic Separator body, Water flow with higher temperature is mixed, and as a result, the temperature of the water returning to the boiler increases.





## Formulas to determine temperature

$$T_2 = ((F_3 - F_1) T_3 + F_1 T_1) / F_3$$

$$T_4 = ((F_1 - F_2) T_1 + F_3 T_3) / F_1$$

## Calculation

As shown in the figure, two primary and secondary circuits are connected to the Hydraulic Separator. For the sizing of the Hydraulic Separator, the temperature difference of any side that leads to a larger sizing is used as the calculation criterion. Usually, the temperature difference of the consumer side (secondary circuit) causes a larger size.

## Circulating water flow is calculated

$Q = \dot{m} c \Delta T$   $Q$ : Thermal capacity

$$\dot{m} (\text{kg/hr}) = \frac{Q (\text{kcal})}{\text{hr}} / \frac{C (\text{kcal})}{\text{kg}} \Delta T (^\circ\text{C})$$

Therefore, the flow of water circulating in the circuit is calculated by the following method:

$$\dot{m} (\text{m}^3/\text{hr}) = \frac{Q (\text{kcal})}{\text{hr}} / \frac{C (\text{kcal})}{\text{kg}^\circ\text{C}} \Delta T (^\circ\text{C}) * 1000$$

## Benefits and Functions of using Hydraulic Separator

- Creating hydraulic balance in primary and secondary circuits
- Separates and vents air from the system.
- Separation and collection of impurities in the primary and secondary circuits

| Benefits and Functions of using Hydraulic Separator |       |                 |
|---|-------|-----------------|
| Head  | Shell | Item            |
| Up to 16" Body size                                 | SA 53 | ASTMA234 GR.WBP |
| More than 16" Body size                             | SA 36 | SA36            |





### **Welding conditions**

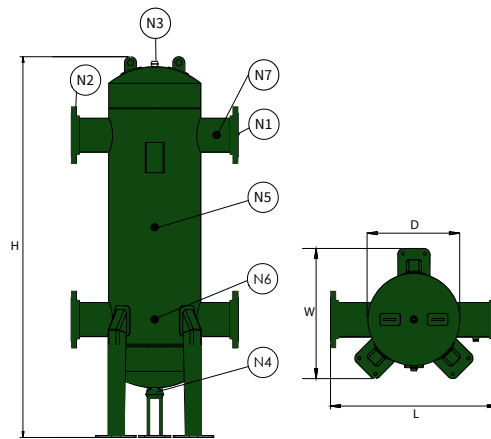
Welding equipment is used from Sweden's ISAB brand. Welding Hydraulic Separator components with the use of penetration welding methods including root pass welding steps, protective gas method Argon, filler pass, and face pass are performed using an electric arc method using an electrode EW7018.

### **Design standard**

The ASME Sec VIII, Div.1 standard is used in the construction of the hydraulic separator Vessel Heads type, are tori spherical, this type of head compared to other shapes of the same thickness has a longer life and higher-pressure resistance.

The production price of each kilo of this lens can reach twice the price of normal lenses in the market.



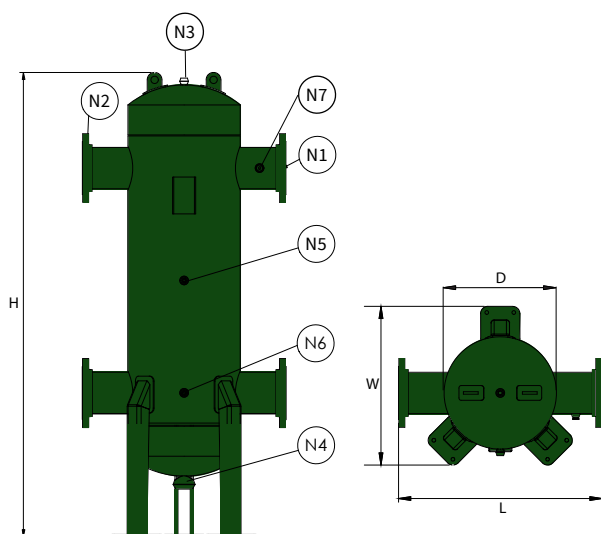


- Hydraulic Separator Is Designed based on Higher Flow Rate. The Consumer Flow Rate Is Always Greater than or Equal to the Producer Flow Rate.
- It Should be noted that the Specified Flow Rates are based on a Temperature Difference of 10 Degrees Celsius for the Heating Load and a Temperature Difference of 5 Degrees Celsius for the Cooling load.

| Model                         | Unit    | PLL 2-8              | PLL 3-10        | PLL 4-12        | PLL 5-16          | PLL 6-18            |
|-------------------------------|---------|----------------------|-----------------|-----------------|-------------------|---------------------|
| <b>Technical Data</b>         |         |                      |                 |                 |                   |                     |
| Design Standard               | —       | ASME SEC. VIII DIV.1 |                 |                 |                   |                     |
| Design Temperature            | °C      | 5-100                |                 |                 |                   |                     |
| Flow Rate                     | gpm     | 1-32                 | 32-90           | 90-175          | 175-350           | 350-550             |
| Heating Load                  | kcal/hr | 1-86,000             | 86,000-200,000  | 200,000-400,000 | 400,000-800,000   | 800,000-1,250,000   |
| Cooling Load *                | Btu/hr  | 1-160,000            | 160,000-450,000 | 450,000-875,000 | 875,000-1,750,000 | 1,750,000-2,750,000 |
| <b>Connection Size</b>        |         |                      |                 |                 |                   |                     |
| Body Size (D)                 | in      | 8                    | 10              | 12              | 16                | 18                  |
| Secondary Inlet & Outlet (N1) | in      | 2                    | 3               | 4               | 5                 | 6                   |
| Primary Inlet & Outlet (N2)   | in      | 2                    | 3               | 4               | 5                 | 6                   |
| Vent (N3)                     | in      | 1/2                  | 1/2             | 1/2             | 1/2               | 1/2                 |
| Drain (N4)                    | in      | 1 1/2                | 1 1/2           | 2               | 2                 | 2                   |
| Manometer (N5)                | in      | 1/2                  | 1/2             | 1/2             | 1/2               | 1/2                 |
| Thermometer (N6)              | in      | 1/2                  | 1/2             | 1/2             | 1/2               | 1/2                 |
| Thermo Switch (N7)            | in      | 1/2                  | 1/2             | 1/2             | 1/2               | 1/2                 |
| <b>Dimension</b>              |         |                      |                 |                 |                   |                     |
| Diameter (D)                  | mm      | 220                  | 275             | 325             | 410               | 460                 |
| Length (L)                    | mm      | 420                  | 525             | 620             | 740               | 830                 |
| Width (W)                     | mm      | 420                  | 465             | 520             | 615               | 645                 |
| Total Height (H)              | mm      | 1,060                | 1,210           | 1,420           | 1,700             | 1,890               |

- The Term “Cooling Load” Refers to Using Hydraulic Separator for Cooling System (Chiller & Fancoil)





| Model                         | Unit    | PLL 8-18             | PLL 10-20           | PLL 12-24            | PLL 14-28             |
|-------------------------------|---------|----------------------|---------------------|----------------------|-----------------------|
| <b>Technical Data</b>         |         |                      |                     |                      |                       |
| Design Standard               | –       | ASME SEC. VIII DIV.1 |                     |                      |                       |
| Design Temperature            | °C      | 5-100                |                     |                      |                       |
| Flow Rate                     | gpm     | 550-1,100            | 1,100-1,980         | 1,980-3,300          | 3,300-4,400           |
| Heating Load                  | kcal/hr | 1,250,000-2,500,000  | 2,500,000-4,500,000 | 4,500,000-7,500,000  | 7,500,000-10,000,000  |
| Cooling Load *                | Btu/hr  | 2,750,000-5,500,000  | 5,500,000-9,900,000 | 9,900,000-16,500,000 | 16,500,000-22,000,000 |
| <b>Connection Size</b>        |         |                      |                     |                      |                       |
| Body Size (D)                 | in      | 18                   | 22                  | 24                   | 28                    |
| Secondary Inlet & Outlet (N1) | in      | 8                    | 10                  | 12                   | 14                    |
| Primary Inlet & Outlet (N2)   | in      | 8                    | 10                  | 12                   | 14                    |
| Vent (N3)                     | in      | 1/2                  | 1/2                 | 1                    | 1                     |
| Drain (N4)                    | in      | 2                    | 2                   | 2                    | 2                     |
| Manometer (N5)                | in      | 1/2                  | 1/2                 | 1/2                  | 1/2                   |
| Thermometer (N6)              | in      | 1/2                  | 1/2                 | 1/2                  | 1/2                   |
| Thermo Switch (N7)            | in      | 1/2                  | 1/2                 | 1/2                  | 1/2                   |
| <b>Dimension</b>              |         |                      |                     |                      |                       |
| Diameter (D)                  | mm      | 460                  | 510                 | 610                  | 715                   |
| Length (L)                    | mm      | 905                  | 950                 | 1,140                | 1,280                 |
| Width (W)                     | mm      | 675                  | 740                 | 815                  | 1,050                 |
| Total Height (H)              | mm      | 2,000                | 2,230               | 2,580                | 2,980                 |

- The Term “Cooling Load” Refers to Using Hydraulic Separator for Cooling System (Chiller & Fancoil)

# 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

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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



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