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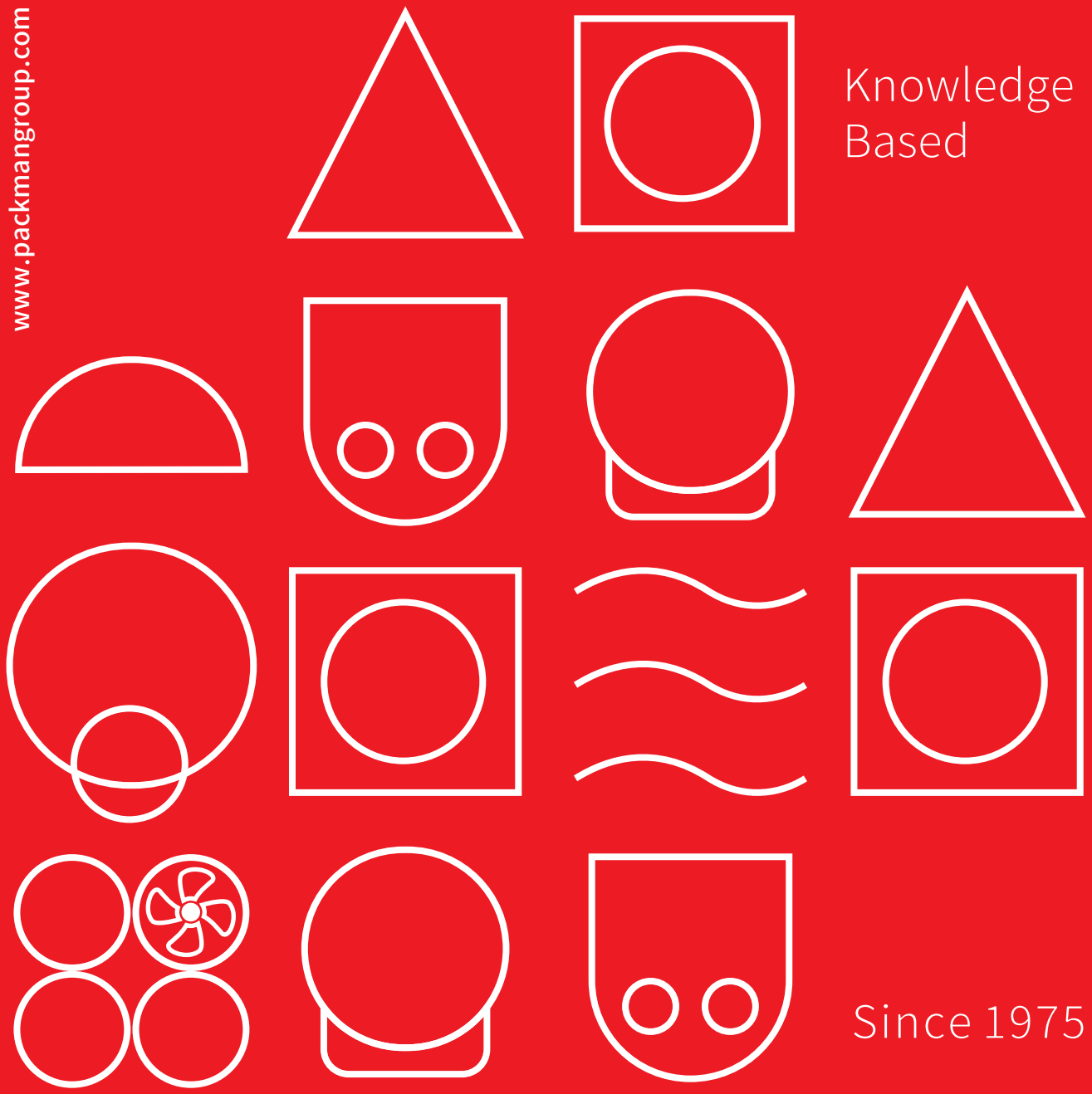
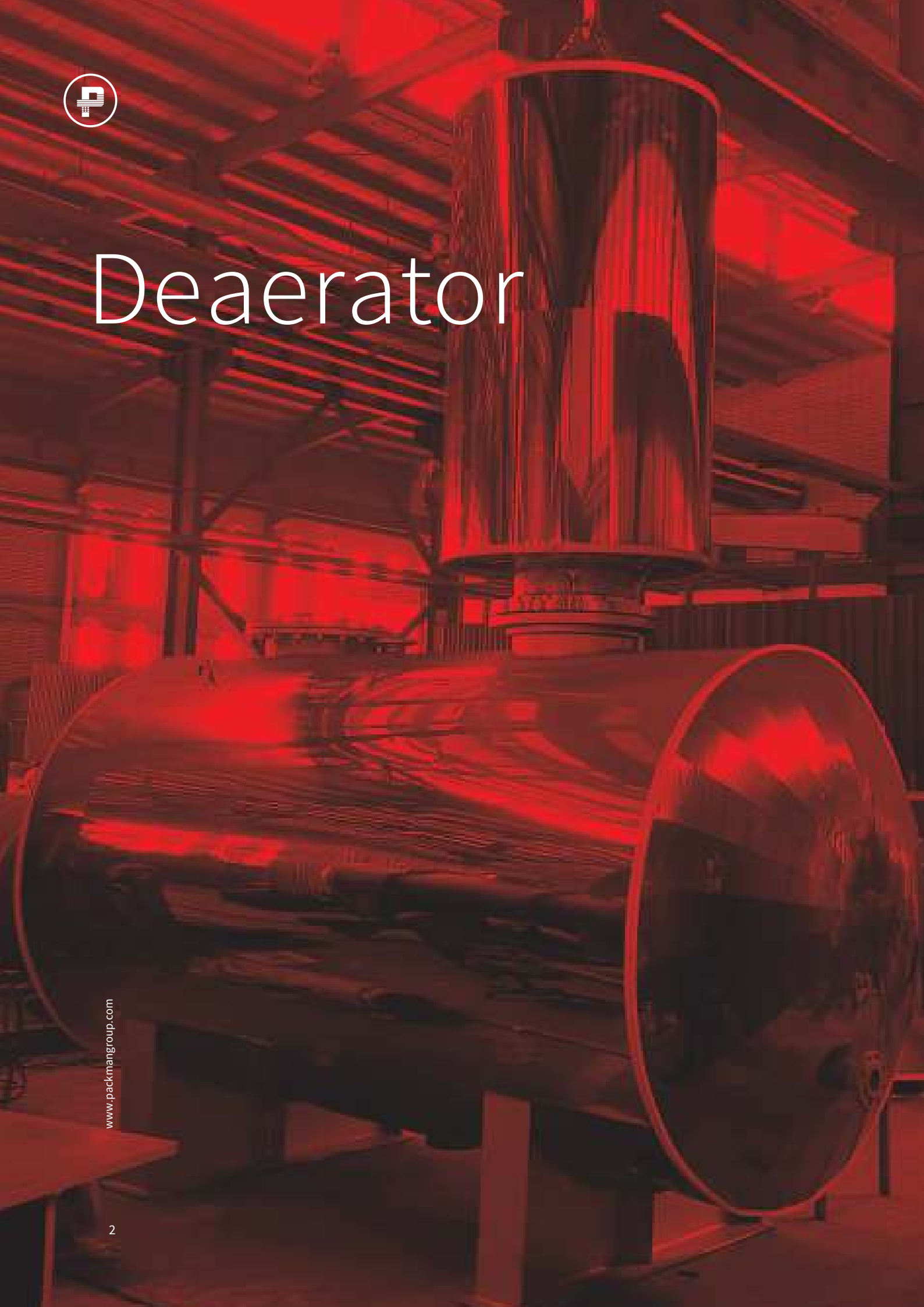
Knowledge
Based



Since 1975

PACKMAN
Industrial Group

Deaerator
powered by PACKMAN industrial group



Deaerator

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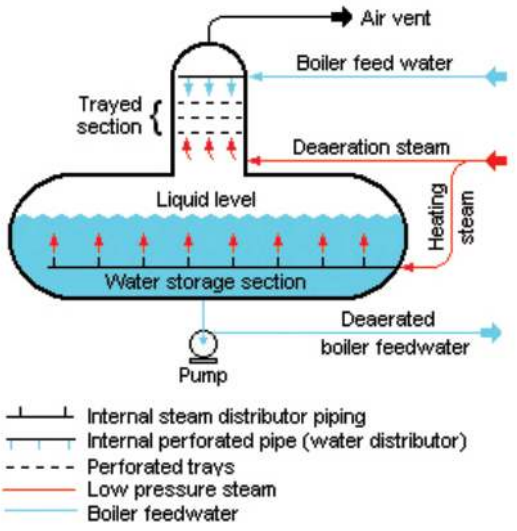
Product Description

A Deaerator is a device that is used for the removal of oxygen and other dissolved gases from the feed-water to steam generators. The deaerator is part of the feed-water heating system. It is usually situated between the last low pressure heater and feed-water booster pumps. In particular, dissolved oxygen in the steam generator can cause serious corrosion damage by attaching to the walls of metal piping and other metallic equipment and forming oxides. Furthermore, dissolved carbon dioxide combines with water to form carbonic acid that causes further corrosion.

In the deaerator, the condensate is heated to saturated conditions usually by the steam extracted from the steam turbine. The extraction steam are mixed in the deaerator by a system of spray nozzles and cascading trays between which the steam percolates. Any dissolved gases in the condensate are released in this process and removed from the deaerator by venting to the atmosphere or to the main condenser. Directly below the deaerator is the feed-water storage tank, in which a large quantity of feed-water is stored at near saturation conditions. In the turbine trip event, this feed-water can be supplied to steam generators to maintain the required water inventory during transient. The deaerator and the storage tank is usually located at a high elevation to ensure an adequate net positive suction head (NPSH) at the inlet to the feedwater pumps. NPSH is used to measure how close a fluid is to saturated conditions. Lowering the pressure at the suction side can induce cavitation. This arrangement minimizes the risk of cavitation in the pump.



PACKMAN Deaerator Properties

DEAERATORS are devices that reduce the amount of oxygen in the water for the steam boiler feeder. They are used for pre-heating the water entering the steam boiler.PACKMAN's DEAERATORS have two main components, one is storage tank with a pre-heating input and another is a tower with a lattice tray to accelerate the separation of gases in the inlet water.

The Storage Tank Specification

- Reservoir storage tank is horizontal cylindrical.
- The tank heads is designed and manufactured in accordance with the ASME standard.
- Hydrostatic test is performed on the tank up to 6 bar pressure.
- The head type of the reservoir is the Torispherical type.
- The tank has man hole and hand-hole which is suitable for pressure vessels.
- The tank has a steam inlet for preheating.
- The base of the tank is in the form of a saddle.
- The sheet is made of steel grade SA36.
- The level of the reservoir is controlled by the LI and control lever with magnetic sensors.
- The tank has the nozzles needed to operate the DEAERATOR.
- Welding of the reservoir is carried out with submerged arc welding.
- The tank has suitable hooks for transportation.

The Tower Specification

- Towers are designed and built according to ASME SEC. VIII, DIV.1.
- Towers are analyzed for seismic loading based on EARTHQUAKE DESIGN CODE.
- Hydrostatic test is carried out on the tower to 6 bar.
- The pressure design is 3.5 bar and the pressure is 0.5 bar.
- Tower made of stainless steel plate with a grade of 304L.
- The tower has stainless steel lattice trays to remove additional gases.
- The tower should have a separate hook for transportation.

Specifications Of The Equipments Installed On The Device A Preheaing line

- Magnetic level control with four sensors for disconnecting and connecting water and steam inlet solo valves
- Water inlet solo valve-220V
- Steam inlet solo valve-220V
- Water thermometer with a temperature rating of 0-120 ° C
- Water manometer with a diameter of 150mm and a rating of 0-4bar
- Relief valve with 15PSI setting point and 5-35bar working pressure Suitable drain valve for the tank.
- Steam pressure line for reducing the inlet vapor pressure (including flange needle,filter,and a flanged vapor pressurizer device with a converter, flanes and related fittings)
- Overflow trap for the tipping of the reservoir to the condensate (Overflow Trap)
- Vacuum Breaker
- Completely electrical wired pane

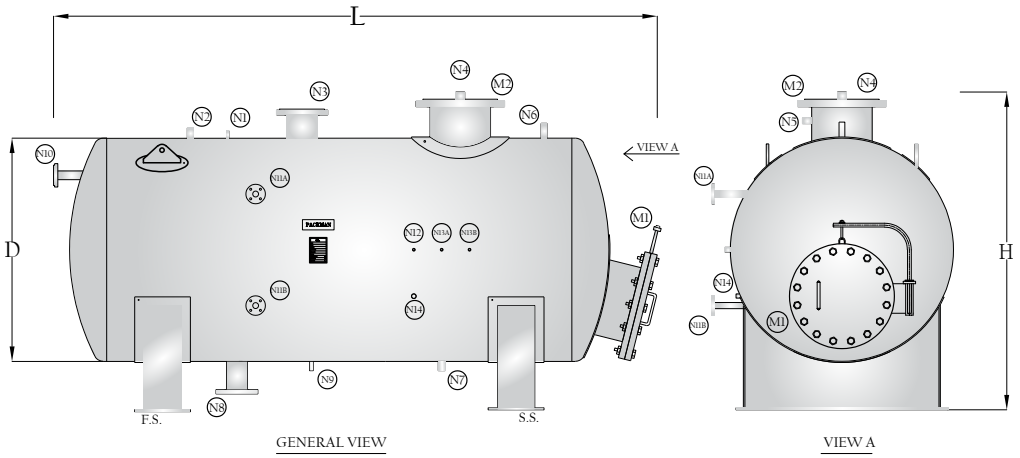
Product Selection

Deaerators are particularly desirable when steam pressures exceed 50 psi. For lower steam pressures, deaerator or a Thermal feed heating assembly may be suitable. Large spread out steam systems with surging returns may require additional storage or a split tank system. High make-up requirements especially dictate the use of a deaerator. Pressurized deaerators must be selected when blend temperatures exceed 180° F.

Horsepower refers to total system boiler capacity served by the deaerator. This capacity determines the size of the heating assembly, the openings, the overflow, the transfer pumps as well as the standard tank. The DEAERATOR capacity is based on the volume of water to be heated, the water temperature rise and the steam pressure available. High temperature returns over 227° do not need to be heated and should be admitted under the water line.

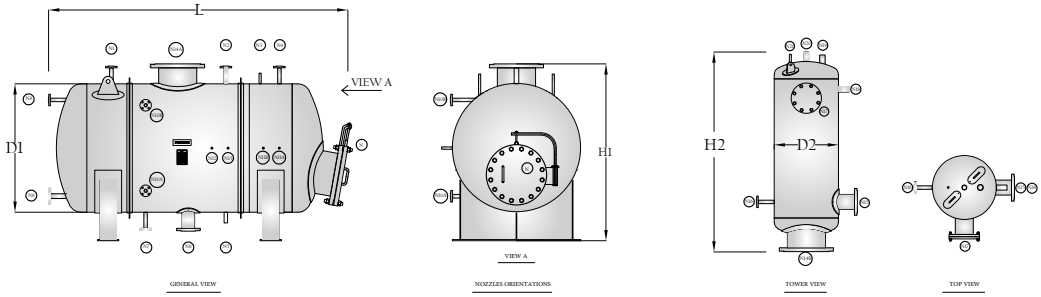
In order to determine the capacity of the deaerator, boiler capacity should be determined. The deaerator is sized for the boiler capacity in pph. The manufacturer designed the DEAERATOR suitable for the boiler capacity. If someone needs to select the deaerator capacity by self, the following formulation could be needed.

Spray Type Deaerator



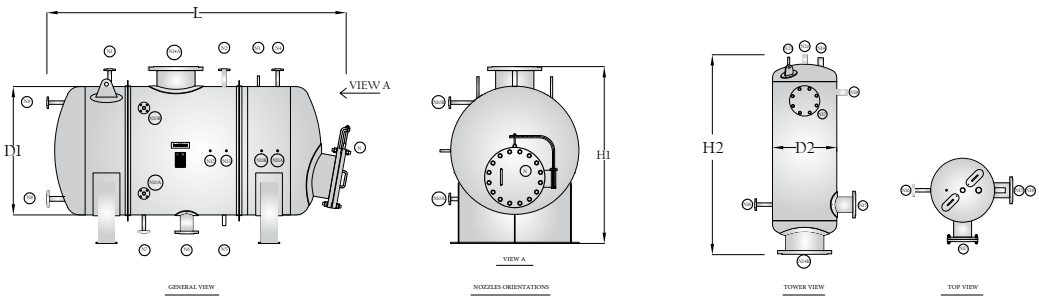
Model	Unit	PDR-S-5	PDR-S-10	PDR-S-18	PDR-S-30	PDR-S-50	PDR-S-70
Technical Data							
Design Standard	-	ASME SEC.VIII. DIV.1					
Flow Rate	lb/ hr	5,000	10,000	18,000	30,000	50,000	70,000
Working Pressure	bar	0.5	0.5	0.5	0.5	0.5	0.5
Connectoins Size							
Vacuum Breaker (N_1)	in	1/2	1/2	1/2	1/2	1/2	1/2
Safety Valve (N_2)	in	3/4	1	1	1 1/4	2	2
Steam Inlet (N_3)	in	3	4	6	6	6	10
Vent (Water Side) (N_4)	in	1	1/2	1 1/4	1 1/4	4	4
Water Inlet (N_5)	in	1	1	1 1/2	1 1/2	1 1/2	2
Vent (Steam Side)(N_4)	in	1	1	1 1/4	1 1/4	4	4
Condensate Return (N_6)	in	1	1	1	1 1/2	1 1/2	2
Drain (N_7)	in	1	1	2	2	2	2
Water Outlet (N_8)	in	3	4	4	5	5	6
Scrubber Drain (N_9)	in	3/4	3/4	3/4	1	1	1
Over Flow (N_{10})	in	1	1	1 1/2	1 1/2	2	2
Level Controller (N_{11})A	in	1	1	1	1	1	1
Level Controller (N_{11})B	in	1	1	1	1	1	1
Thermometer (N_{12})	in	1/2	1/2	1/2	1/2	1/2	1/2
Temperature Sensor (N_{13})	in	1/2	1/2	1/2	1/2	1/2	1/2
Circulation Pump (N_{14})	in	1	1	1	1	1	2
Hand Hold (M_2)	in	10	12	12	12	12	12
Man Hole (M_1)	in	16	16	16	16	16	16
Dimensions							
Vessel Diameter (D)	mm	1100	1200	1200	1200	1600	1750
Vessel Length (L)	mm	2300	2400	3400	4000	4200	4600
Vessel Height (H)	mm	1580	1700	1700	1700	2100	2300

Tray type Deaerator



Model	Unit	PDR-T-10	PDR-T-18	PDR-T-25	PDR-T-30	PDR-T-50	PDR-T-70	PDR-T-110	PDR-T-150
Technical Data									
Design Standard	-	ASME SEC.VIII. DIV.1							
Flow Rate	lb/hr	10,000	18,000	25,000	30,000	50,000	70,000	110,000	150,000
Working Pressure	bar	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Number Of Tower	-	1	1	1	1	1	1	1	2
Connectoins Size									
Tank Connections									
Man Hole (N)	in	16	16	16	16	16	16	16	16
Equalizer (N_1)	in	1	1	1	1	1	1	1	1
Minimum Flow (N_2)	in	1	1	1	1	1	1	1 1/2	2
Pressure Indicator (N_3)	in	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Spare (N_4)	in	1	1	1	1	1	1 1/2	1 1/2	1 1/2
Drain (N_5)	in	1	1	2	2	2	2	2	2
Outlet (N_6)	in	4	4	5	5	6	6	6	6
Chemical Dosing Inlet (N_7)	in	1	1	1	1	1	1	1	1
Heating Steam Inlet (N_8)	in	1 1/2	1 1/2	2	2	4	4	5	5
Steam Trap (N_9)	in	1	1	1	1	1 1/2	1 1/2	1 1/2	1 1/2
Level Gauge (N_{10}) A/B	in	1	1	1	1	1	1	1	1
Temperature Switch (N_{11}) A/B	in	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Temperature Indicator (N_{12})	in	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Tower Connections									
Tower (N_{14})	in	10	14	14	14	16	16	20	16
Heating Steam Inlet (N_{15})	in	3	5	5	5	6	6	6	6
Equalizer (N_{16})	in	1	1	1	1	1	1	1	1
Tray Access Door (N_{17})	in	6	6	6	6	6	6	8	6
Inlet Denim Water (N_{18})	in	1 1/4	1 1/2	1 1/2	1 1/2	2	2	2	2 1/2
Safety Valve (N_{19})	in	1	1	2	2	2	2	2	2 1/2
Vent (N_{20})	in	1	1	1 1/2	1 1/2	2	2	2	2

Tray Type Deaerator



Model	Unit	PDR-T-10	PDR-T-18	PDR-T-25	PDR-T-30	PDR-T-50	PDR-T-70	PDR-T-110	PDR-T-150
Dimensions									
Tank Dimension									
Vessel Diameter (D_1)	mm	1100	1200	1200	1200	1600	1600	1900	2250
Vessel Length(L_1)	mm	2200	2800	3150	3400	4700	4830	5100	5700
Vessel Height (H_1)	mm	1600	1650	1650	1650	2100	2100	2410	2750
Tower Dimension									
Tower Diameter (D_2)	mm	410	600	700	700	800	800	900	800
Tower Height (H_2)	mm	1350	1850	2150	2150	2100	2500	2810	2550

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
- ∩ Hospitally 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

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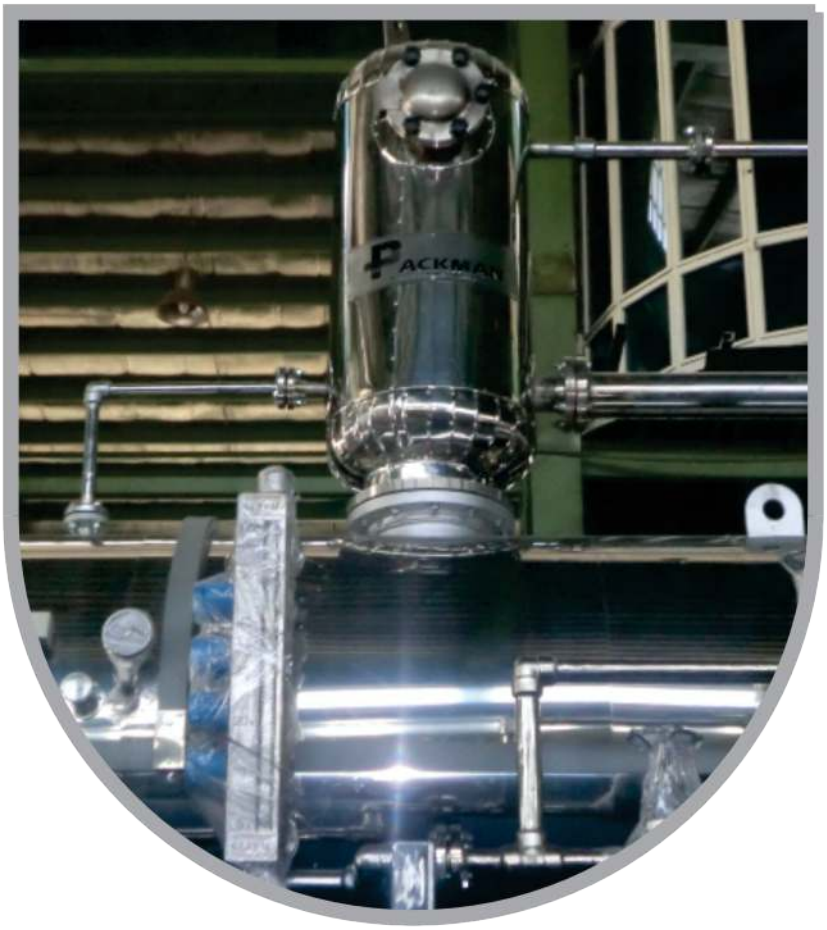

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