

Roots pumping stations

Proven solutions for Roots pumping stations



What is a pumping station?

Pumping stations are combinations of individual pumps. The standard pumping stations in this chapter are composed of a Roots pump and an oil-lubricated or dry backing pump which compresses against atmospheric pressure.

Special pumping stations are two-stage or multi-stage pumping stations with different types of pumps connected in series or parallel.

The following pump types can be used:

- Single-stage and two-stage rotary vane pumps
- Dry pumps
- Roots pumps
- Turbopumps

The complete vacuum solution

Pfeiffer Vacuum provides you with a complete customer-specific vacuum solution from a single source. Our pumping stations can be complemented with measuring and analytical devices as well as pumping station controls (SPS).

Typical applications

- Load locks and transfer chambers
- Optical coatings
- Electron beam welding
- Vacuum drying
- Metallurgy
- Wear protection
- Photovoltaics
- Space simulation



Electron beam welding



Metallurgy



Photovoltaics





CombiLine WU with UnoLine Plus



CombiLine WU with HenaLine



LRS 1



LRS 2



LRS 3

Series

Pumping stations with single-stage rotary vane pumps:

CombiLine WU with UnoLine Plus

- Pumping speeds of up to 5,000 m³/h
- Ultimate pressure of up to $2 \cdot 10^{-3}$ hPa
- Air cooled (water cooling for backing pump)
- Integrated oil mist separator and oil return unit
- Components mounted on a common frame and connected up

CombiLine WU with HenaLine

- Pumping speeds of up to 5,700 m³/h
- Ultimate pressure of up to $8 \cdot 10^{-3}$ hPa
- Air cooled (water cooling for backing pump optional)
- Integrated oil mist separator and oil return unit
- Components mounted on a common frame and connected up

Pumping stations with two-stage rotary vane pumps:

LRS 1

- Pumping speeds of up to 360 m³/h
- Ultimate pressure of up to $2 \cdot 10^{-4}$ hPa
- Integrated overflow valve
- Air-cooled
- Compact

LRS 2

- Pumping speeds of up to 360 m³/h
- Ultimate pressure of up to $2 \cdot 10^{-4}$ hPa
- Air-cooled
- Modular configuration
- Components mounted on a common frame and connected up

LRS 3

- Pumping speeds of 360 to 720 m³/h
- Ultimate pressure of up to $2 \cdot 10^{-4}$ hPa
- Air-cooled
- Modular configuration
- Components mounted on a common frame and connected up



CombiLine WD with DuoLine

- Pumping speeds of up to 3,000 m³/h
- Ultimate pressure of up to $5 \cdot 10^{-4}$ hPa
- Integrated safety and gas ballast valve
- Complete pumping station with optional magnetic coupling
- Components mounted on a common frame and connected up

Oil-free pumping station, with dry compressing backing pump:**DRS 1**

- Pumping speeds of up to 285 m³/h
- Ultimate pressure of up to $3 \cdot 10^{-3}$ hPa
- Combination of single-stage and multi-stage Roots pumps
- Air-cooled
- Components mounted on a common frame and connected up

CombiLine WH with UniDry 50

- Pumping speeds of up to 470 m³/h
- Ultimate pressure of up to $5 \cdot 10^{-3}$ hPa
- Versions available with convection cooling or water cooling as well as an optional inert gas panel
- Contact-free compression
- Components mounted on a common frame and connected up

CombiLine WH with HeptaDry

- Pumping speeds of up to 5,800 m³/h
- Ultimate pressure of up to $5 \cdot 10^{-4}$ hPa
- Combination of Roots pumps and screw pumps
- Contact-free compression
- Components mounted on a common frame and connected up



CombiLine WD with DuoLine



DRS 1



CombiLine WH with UniDry 50



CombiLine WH with HeptaDry

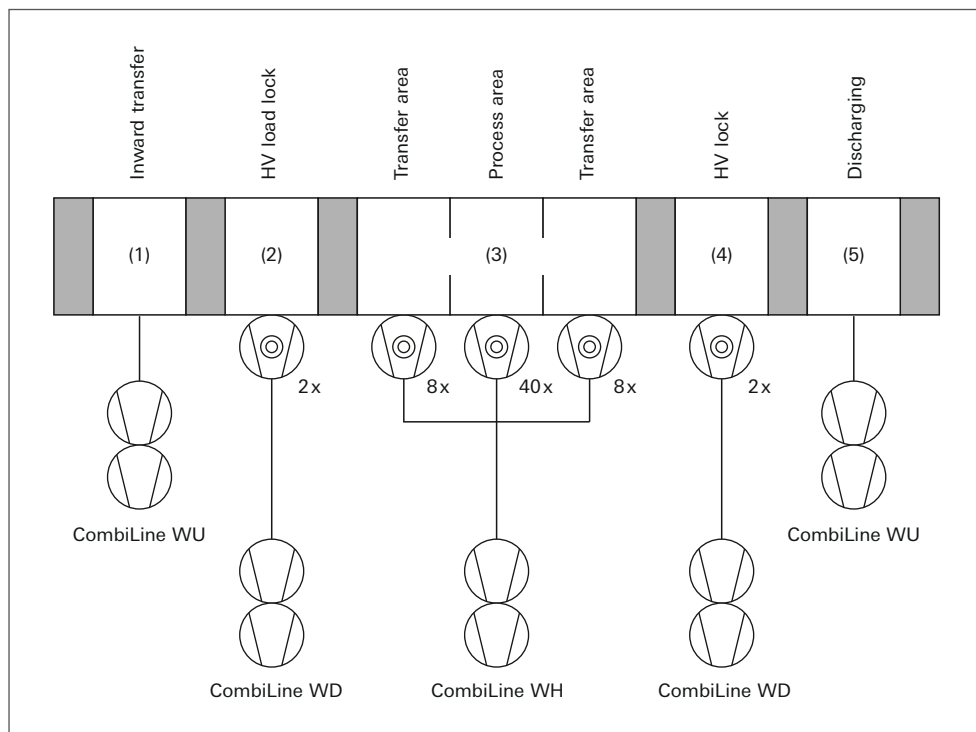


Further information on our
Roots pumping stations can be found at
www.pfeiffer-vacuum.com



Customized pumping stations (special pumping stations)

The versatility of Roots pumping stations is shown by the following example of a glass coating plant:



Example of a glass coating plant

(1) Quickest possible inwards transfer of a substrate with atmospheric pressure at a high pumping speed of the mechanical backing pump (in this case a single-stage rotary vane pump) and a high pumping speed of the Roots pump to the transfer pressure of the subsequent HV load lock.

(2) In the HV load lock a combination of a Roots pump is used as a backing pump for turbopumps to lower the pressure to the high vacuum range. This pumping station uses a two-stage rotary vane pump for an optimal backing pressure for the turbopumps.

(3) In the processing and transfer area a dry Roots pumping station with a high pumping speed serves as a backing pump system for a large number of turbopumps. In this chamber a low base pressure needs to be generated and high gas loads must also be evacuated from the chamber during the process and compressed against atmospheric pressure.

(4) and (5) The outlet side load locks are structured symmetrically to the inlet-side load locks.

ATEX-certified Roots pumps are available for flammable gas mixtures. For applications with extreme backing pump pumping speed requirements, our gas-circulation-cooled Roots pumps can be supplied in a stage which compresses against atmospheric pressure.



For requirements of extremely high pumping speeds and/or ultimate pressures < 10^{-3} hPa:

We offer multi-stage pumping stations with maximized pumping speeds as well as variations with Pfeiffer Vacuum turbopumps for use in high vacuum. We develop and manufacture individual solutions for you which are adapted to fit your application.

Your benefits: our expertise

- Complete design of vacuum systems
- Precise dimensioning of components, based on in-house developed calculation programs
- Perfectly adapted to your process requirements

If you give us the design specifications we will calculate the:

- Pumping speed
- Evacuation times
- Conductivity
- Intermediate pressures
- Gas outlet temperature
- Cooling effect



Three-stage pumping station for steel degassing



Three-stage module for steel degassing



Gas-cooled pumping station for high pumping speeds and high vacuum

