



CombiLine™

Proven solutions for Roots pumping stations
More advice. More competence. More than just vacuum.

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Coating



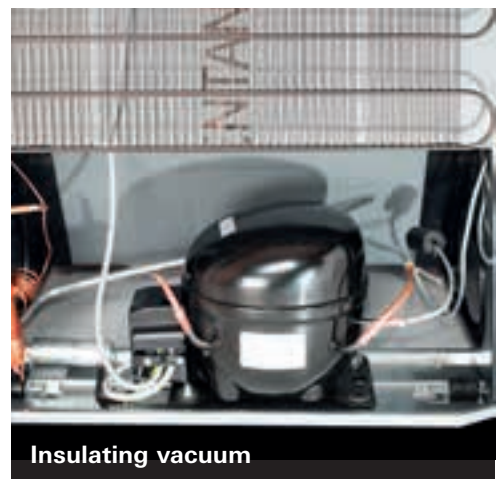
Freeze drying



Transformer drying



Space simulation



Insulating vacuum



Steel degassing



Lithium ion batteries



Customized solutions for your application

In many applications, pumping station combinations that are specially tailored to the process are used. Pfeiffer Vacuum offers an extensive range of vacuum pumping stations to satisfy these diverse requirements. This consists of various pump combinations and is supplemented by suitable components, valves and gauges. If our standard solutions do not fit your application, we will configure together with you an appropriate solution from our extensive product portfolio.

Pfeiffer Vacuum offers a broad range of Roots pumping stations that feature different backing pumps, gradations and accessories. Roots pumping stations are used in low and medium vacuum applications and offer a reliable solution with high pumping speeds in the transition range from atmosphere to 10^{-3} mbar. The right combination of the various vacuum pumps offers a perfect solution for your applications in production and research.

Pfeiffer Vacuum – Your ideal partner!

- 50 years of experience in building pumping stations
- High level of competence
- Innovative, absolutely reliable products
- High level of technology
- Pressure range from atmospheric pressure to high vacuum
- Standard pumping stations and customized solutions
- Support in designing your vacuum system
- Magnetically coupled pumping stations also available – hermetically tight and maintenance-free
- Pumps are also available for processes in potentially explosive environments, or for evacuating explosive gases

Proven solutions for Roots pumping stations More advice. More competence. More than just vacuum.

- What is a pumping station?** Pumping stations are combinations of individual pumps. They can include the following major components:
- Roots pumps
 - Rotary vane pumps
 - Turbopumps
 - Dry pumps
 - Liquid ring pumps
 - Cryopumps
 - Diffusion pumps
 - Gauges
 - Analytical equipment
 - Tube lines
 - Valve technology
 - Pumping station control systems (including PLC versions with visualization)
- In addition to these components, we also offer a comprehensive portfolio of accessories to equip your specific CombiLine pumping station.
- Real added value for you!** We provide you with individual support, we train you and provide on-site service worldwide.

- Customer benefits**
- Complete line of pumps offers flexibility and maximum process capability
 - Fast evacuation due to high compression ratio
 - Low operating costs thanks to optional magnetic coupling or integrated efficient motor technology
 - Process adaptation and energy savings possible thanks to frequency converter operation
 - System integration very easy due to compact series and smart interfaces



Typical applications

- Electron beam welding
- Space simulation
- Freeze drying
- Insulation vacuum
- Leak detection systems
- Coating (load/load-lock chambers)
- Vacuum furnaces
- Steel degassing
- Distillation
- Oil purification
- Drying applications such as transformer drying or lithium-ion batteries

Roots pumps

Roots pumps of the HiLobe and OktaLine series can be tailored with different pumping speeds and versions to perfectly meet customers' requirements. These pumps require a backing pump that is suitable for the application and is adjusted to the gas flow.

The gear box and bearings of Roots pumps are separated from the gas pumping chamber. The frictionless pumping action of the pistons means that dry operation is assured. These pumps are therefore ideally suited for low and medium vacuum applications. They are frequently used in chemical and process engineering, the coating and semiconductor industries as well as in research and development.

HiLobe – the compact powerhouse

The modern and very powerful HiLobe pumps meet energy efficiency class IE4, and their latest interface technology enables seamless plug & play integration with the control system. Small sizes and a variety of vertical and horizontal installation positions also facilitate their integration into existing systems. Their intelligent drive concept and condition monitoring contribute to making HiLobe pumps extremely low-maintenance. High machine availability is assured due to long service intervals and easy maintenance through our global on-site service.

With its powerful drive, the HiLobe can reach a very high differential pressure for a short time. This makes it particularly suitable for load lock applications, such as in PVD coating systems and leak detection. These are processes that require extremely short cycle times.



HiLobe 1302 – the compact powerhouse



HiLobe 2104 – the compact powerhouse



OktaLine – the proven allrounder



OktaLine ATEX – the explosion-proof pump

**OktaLine –
the proven allrounder**

The Roots pumps of our established OktaLine series are available in very large pumping speed ranges and characterized by high compression in the end vacuum. Due to many years of experience with our allrounder, we can offer a wide diversity of model variants and a full range of accessories that enable us to configure pumps for your individual process.

Thanks to the proven convection cooling system, cost-intensive water cooling is no longer necessary. They can optionally be equipped with a frequency converter package for even higher pumping speeds. The integrated overflow valve and optional magnetic coupling guarantee enhanced process reliability.

**OktaLine ATEX –
the explosion-proof pump**

For evacuating explosive gases or for processes in explosive environments, we have developed the OktaLine ATEX, which is based on the proven concept of the standard OktaLine Roots pumps. Due to extensive testing and the standardized magnetic coupling, the series is able to meet the stringent explosion protection requirements.

**OktaLine G –
for high differential
pressures**

OktaLine G gas circulation-cooled Roots pumps offer additional flexibility. These pumps are ideal for compressing against atmospheric pressure in applications with high pressure differences and maximum gas throughput. Thanks to their special cooling system, these Roots pumps can also be operated without a backing pump.



OktaLine G – for high differential pressures

Backing pumps

Rotary vane pumps

Pfeiffer Vacuum rotary vane pumps have been the most popular pumps for generating low and medium vacuum for many years now. They are very durable and robust. Rotary vane pumps belong to the family of displacement pumps and convey a virtually steady low-pulsation volume flow, irrespective of the type of gas used. They work on the principle of an eccentrically supported rotor revolving in a housing and have two or more movable gate valves. Every Pfeiffer Vacuum rotary vane pump is oil-lubricated. Special operating fluids are responsible for insulating and lubricating components, resulting in very low final pressures. The oil lubrication also ensures an extremely long lifetime, even in continuous operation.

HenaLine – single-stage rotary vane pumps

The single-stage rotary vane pumps in the HenaLine have long been some of the most widely used products for processes in the low and medium vacuum range. Their long life and pumping speed, irrespective of the gas used, are outstanding properties of these pumps. With its pumping speeds from 25 to 1,920 m³/h, the HenaLine range covers virtually all applications in industry and coating technology.

UnoLine Plus – especially for industrial applications

The UnoLine Plus can be optimally employed for industrial applications. This rotary vane pump has proven itself for years as a backing pump for Roots pumps. This pump is water cooled and extremely insensitive to dust and dirt. It is equipped with an oil regeneration system. Condensates, contaminants and dust particles can be separated from the operating fluid, collected in the vapor separator and drained. The adjustable cooling water controller enables the UnoLine Plus pump to maintain the required operating temperature. These pumps are equipped with gas ballast in order to pump down vapors.



HenaLine – single-stage rotary vane pumps



UnoLine Plus – especially for industrial applications



DuoLine – two-stage rotary vane pumps



HeptaDry – the dry alternative

**DuoLine –
two-stage rotary vane
pumps**

Two-stage rotary vane pumps can be operated in the pressure range between 100 hPa and $3 \cdot 10^{-2}$ mbar. Pumps belonging to the DuoLine series cover a pumping speed range of 1.3 to 250 m³/h. Their long lifetime and pumping speed, irrespective of the gas used, are the outstanding properties of these pumps. They are available in a standard version with a shaft seal for use in straightforward applications. DuoLine pumps with a magnetic coupling dispense with the need for shaft seal maintenance. There are corrosive versions available for pumping aggressive media.

Screw pumps

**HeptaDry –
the dry alternative**

The dry HeptaDry screw pump is the optimal solution for all areas requiring oil-free vacuum. The pumps are ideal for low and medium vacuum applications. They are not only suitable for industrial applications, but also for coating. Pumping speeds in this series range from 100 to 2,500 m³/h.

The one-piece rotors are a special advantage. They work completely contactlessly and thus wear-free, and do not require a lubricant in the pump chamber. This significantly reduces maintenance costs compared to oil-sealed backing pumps. Thermally sensitive gases can also be pumped. A dynamic wear-free seal between the bearing and the pumping chamber increases operational safety. The innovative design and low speed of the pumps result in low stressing of the bearings and seals.

Pumping station control

CombiLine pumping stations can be equipped with various control options. These different options allow easy integration of the pumping stations into your system.

Variants of pumping station control with OktaLine

The CombiLine pumping stations with OktaLine Roots pumps are available with a control cabinet mounted on the frame for controlling the pumping station.

A central electrical connection via terminals in the control cabinet (plug and play solution) is required on the customer's side.

Different options of pumping station control with HiLobe

CombiLine pumping stations with HiLobe Roots pumps can be equipped with two different control options:

With RC5500 controller mounted on frame

In this version, the pumps are mounted on a frame. The frequency converter designed for the HiLobe is installed in the RC5500 control box and connected to the pump.

Required electrical connections on the customer's side:

HiLobe with a Harting plug (included in delivery) on the RC5500 backing pump via the motor terminal board

With switch cabinet

In this option, the frequency converter for the HiLobe is housed in a control cabinet mounted on the frame. The backing pump and the HiLobe are electrically connected to the control cabinet.

Required electrical connections on the customer's side:

A central electrical connection is required via terminals in the control cabinet (plug and play solution).

The pumping station is controlled using the DCU control unit installed in the switch cabinet



RC5500



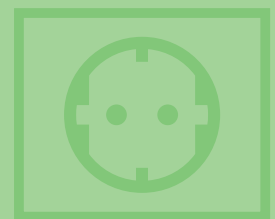
Switch cabinet

We promote sustainable solutions



Energy-saving and durable

Integrating modern HiLobe Roots pumps is a sustainable and environmentally friendly way to increase the efficiency of pumping stations. In addition to a long service life and operational reliability, these pumps feature motors with energy efficiency class IE4. Thus they significantly contribute to reducing operating costs and also, in particular, energy use. Thanks to the sophisticated ventilation concept of the HiLobe, complex water cooling can also be dispensed with, thereby saving resources and reducing your operating costs.



Sustainability and social responsibility

Our CombiLine pumping stations are all optimally adapted to your process by our experts to find the most cost-effective and efficient solution for your application. When procuring the various components and manufacturing our pumps, Pfeiffer Vacuum places the utmost importance on fair business practices, an employee-oriented human resources policy, economical use of natural resources, as well as climate and environmental protection.



Pumping station overview

CombiLine™ RU Roots pumping stations

HiLobe™ with HenaLine™ single-stage rotary vane pumps

- Ultimate pressure of up to $3 \cdot 10^{-2}$ mbar
- Cost-effective solution
- Metallurgy, load locks, helium leak detection, electron beam welding

These pumping stations are typically used for helium leak detection. With the use of the HiLobe, they also play an important role in the rapid evacuation of load lock chambers for the insertion and removal of components, but also for electron beam welding and surface coating.

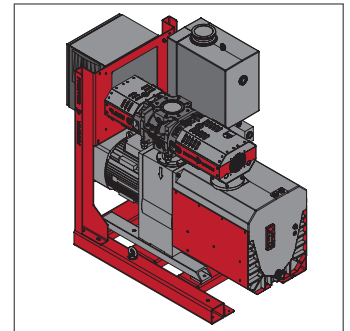


CombiLine™ RD Roots pumping stations

HiLobe™ with DuoLine™ two-stage rotary vane pumps

- Ultimate pressure of up to $1 \cdot 10^{-3}$ mbar
- Backing station for high vacuum pumps
- Metallurgy, coating, research & development, photovoltaics, vacuum drying

These classic pumping stations are used for a variety of coating applications and are particularly suitable as backing pumping stations for high vacuum pumps. Potential uses for these pumping stations include applying wear protection coatings for turning and drilling tools, decorative coatings for gemstones and optical coatings for eyeglass lenses or architectural glass. A further field of application is metallurgy, where hardening or nitriding is used to achieve changes in material properties.



CombiLine™ RH Roots pumping stations

HiLobe™ with HeptaLine™ screw pumps

- Ultimate pressure of up to $5 \cdot 10^{-3}$ mbar
- Dry, oil-free suction chamber
- Coating, metallurgy, vacuum drying, degassing, photovoltaics

These Roots pumping stations are used in applications ranging from the chemical industry and complex industrial applications to production plants for photovoltaics. A key feature is the dry, oil-free backing pump, which allows aggressive media to be pumped.



**CombiLine™ WU
Roots pumping stations**

**OktaLine™ with UnoLine™ Plus single-stage
rotary vane pump**

- Ultimate pressure of up to $2 \cdot 10^{-3}$ mbar
 - Cost-effective solution
 - Hardening, melting, vacuum drying and degassing
- Pumping stations of this type are used in metallurgy, and have proven themselves particularly in the HIP process through extremely long service lives. The main applications are hardening, casting or melting of materials. Another typical application is vacuum drying and degassing.



**CombiLine™ WU
Roots pumping stations**

**OktaLine™ with HenaLine™ single-stage
rotary vane pump**

- Ultimate pressure of up to $8 \cdot 10^{-3}$ mbar
- Cost-effective solution
- Metallurgy, load locks, helium leak detection, electron beam welding

A typical application for these pumping stations is helium leak detection, which enables the detection and localization of the smallest leaks within a very short time. These pumping stations play an important role in the rapid evacuation of load lock chambers for the insertion and removal of components. Further types of use are electron beam welding and surface coating.



**CombiLine™ WD
Roots pumping stations**

**OktaLine™ with DuoLine® two-stage
rotary vane pumps**

- Ultimate pressure of up to $5 \cdot 10^{-4}$ mbar
- Backing station for high vacuum pumps
- Metallurgy, coating, research & development, photovoltaics, vacuum drying

These are classic pumping stations for a wide range of coating applications. These pumping stations are particularly suitable as backing stations for high vacuum pumps. Potential uses for these pumping stations include applying wear protection coatings for turning and drilling tools, decorative coatings for gemstones and optical coatings for eyeglass lenses or architectural glass. A further field of application is metallurgy. By means of hardening or nitriding, changes in material properties are achieved.



**CombiLine™ WH
Roots pumping stations**

OktaLine™ with dry compressing HeptaDry™ pump

- Ultimate pressure of up to $2 \cdot 10^{-3}$ mbar
- Dry, oil-free suction chamber
- Coating, metallurgy, vacuum drying, degassing, photovoltaics

The range of applications for Roots pumping stations is particularly wide. It ranges from applications in the chemical industry and complex industrial applications to photovoltaic production plants. A key feature of this series is the dry, oil-free backing pump. This means that fluids which react with pump oil can be pumped.



Customized pumping station solutions

For requirements involving extremely high pumping speeds and/or ultimate pressures $< 10^{-3}$ mbar, we have multi-stage pumping stations as well as variants featuring Pfeiffer Vacuum turbopumps for use in high vacuum. We develop and manufacture individual solutions for you, tailored to your application. Our CombiLine pumping stations can be used, for example, for evacuating space simulation or electron beam welding chambers. Very successful applications include use in glass coating and solar technology.

Pump selection – depending on the application, we offer:

- Oil circulation lubricated rotary vane pumps, single or two-stage (including magnetically coupled versions)
- Liquid ring pumps
- Dry-compressing backing pumps (including magnetically coupled versions)
- Roots pumps (including magnetically coupled versions)
- Turbopumps (including magnetically coupled versions)
- Oil diffusion pumps
- Cryopumps
- Scroll and diaphragm pumps

Our competence

Complete design of vacuum systems

- Precise dimensioning of components, based on calculation programs developed in-house
- If you give us the design specifications, we will calculate the:
 - Pumping speeds
 - Evacuation times
 - Conductivities
 - Intermediate pressures
 - Gas exit temperatures
 - Cooling effects



Accessories for pumping stations

Accessories

For our CombiLine pumping stations, we offer optional accessories according to your requirements.

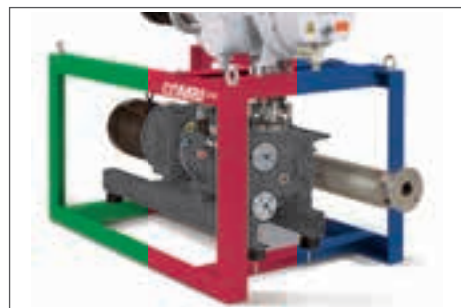
- Oil pan
- Swivel casters/machine feet
- Color variants
- Valve before the pumping station
- Gauge ahead of the pumping station
- Gauge between the pumping stages
- Switch cabinet with control unit
- ProfiNet/EtherCat interface



Gauges



Oil pan



Different color variants



Switch cabinet with control unit



Swivel casters/machine feet



Valves

VACUUM SOLUTIONS FROM A SINGLE SOURCE

Pfeiffer Vacuum stands for innovative and custom vacuum solutions worldwide, technological perfection, competent advice and reliable service.

COMPLETE RANGE OF PRODUCTS

From a single component to complex systems:

We are the only supplier of vacuum technology that provides a complete product portfolio.

COMPETENCE IN THEORY AND PRACTICE

Benefit from our know-how and our portfolio of training opportunities!

We support you with your plant layout and provide first-class on-site service worldwide.

Are you looking for a
perfect vacuum solution?
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