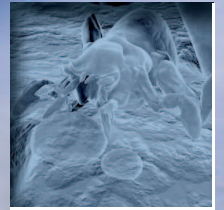
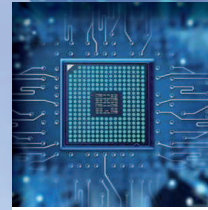
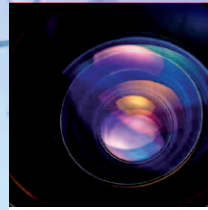


Vacuum for Research & Development



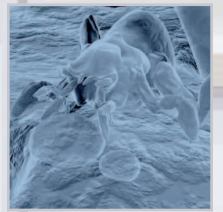
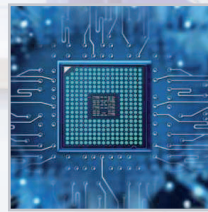
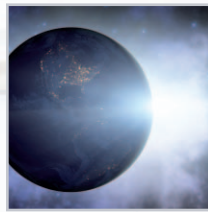
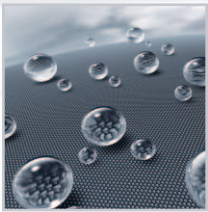


Leybold

UNIVEX 450C

Best conditions for unusual solutions


Extensive research & development often precedes great technological breakthroughs and advancements. Our vacuum engineering specialists are able to customize solutions for you by taking advantage of our vacuum expertise and experience. We want to partner with you from the very beginning of your research and help you to meet your goals and ultimately achieve success.



The image shows two large, white, dome-shaped observatories perched on a dark, volcanic peak. The sky is a mix of blue, purple, and orange, indicating sunset. The ground is dark and rocky, and the overall scene is serene and futuristic.

Take a look into the future

Observatories high atop Mauna Kea volcano, Hawaii, at sunset.



Vacuum technology not only enables us to gaze into the future but also to peer into the distant past. Giant telescopes like the ones used at Mauna Kea Observatory in Hawaii, the Instituto de Astrofísica in the Canary Islands and the European Southern

Observatory in Chile rely on their flawless mirrors whose reflective coatings would not be possible without vacuum technology such as that provided by Leybold.

Material sciences

Material science is an interdisciplinary field which deals with the discovery and design of new materials, involving studies of its synthesis, structure, properties and performance. The research activities cover the whole range of materials including electronics, optical and magnetic materials, polymers, medical implant materials and nano-materials like e.g. Graphene. Thus it is a main driver for the development in the fields of electronics, pharmaceuticals & medicine, energy, nanotechnology and industrial production of materials in general.

Example applications:

- Research for new coating processes
- Material research
- Nano structures
- Layer performance (thin layer technology)

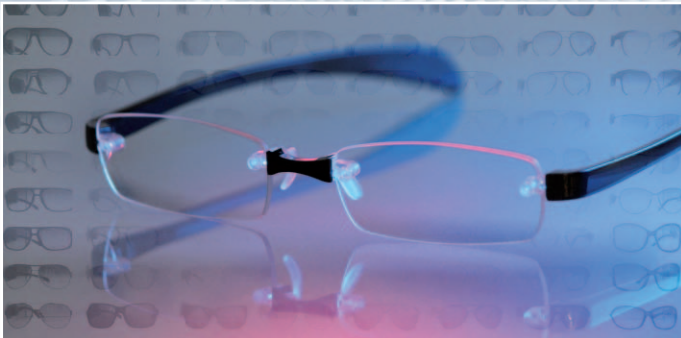
Products

Modular turn-key
UHV experimentation systems

UNIVEX high vacuum multi-chamber experimentation systems

Optical coatings

Optical coatings should improve reflection or transmission properties of optical systems such as filters, lenses, eye glasses or mirrors. Typical optical coatings are a composition of various thin film layers for antireflection (e.g. eye glasses), high-reflector (e.g. filters) or transparent conductive coatings. They are produced by state-of-the-art sputtering or evaporation processes.



Products

Turbomolecular pumps

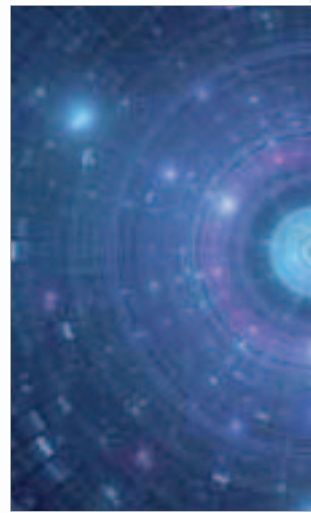
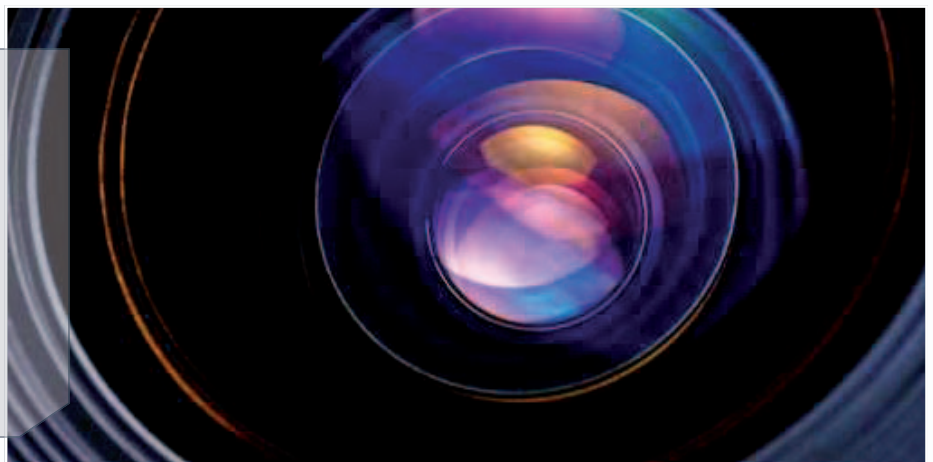
TURBOVAC MAG
with magnetic suspension

TURBOVAC i/iX
with hybrid bearing technology

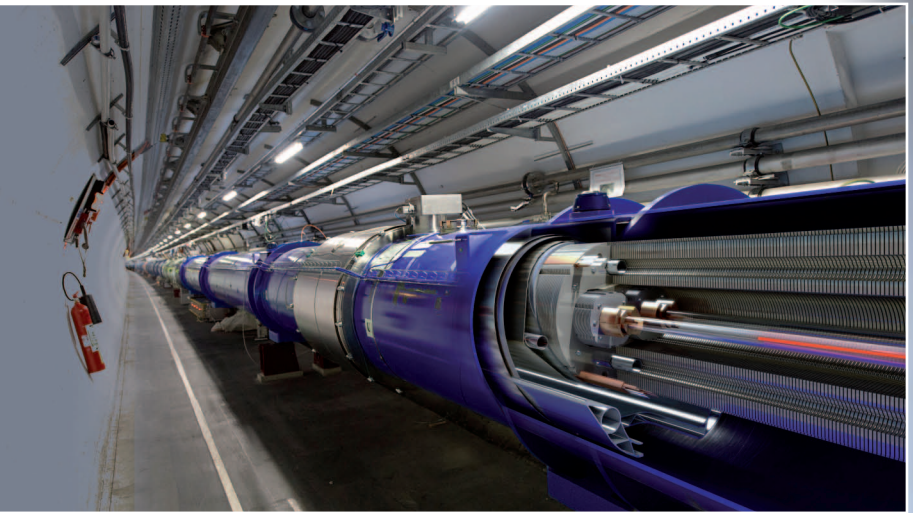
Dry fore-vacuum pumps

DRYVAC, LEYVAC screw pumps

SCROLLVAC scroll pumps



Particle accelerators generate high energy particles (electrons, protons, ions) for fundamental nuclear research.



High Energy Physics

In many research centers storage rings are joined to accumulate a high beam current and accelerate to higher energies. Highest energies are achieved today at the LHC ring at CERN (Geneva).

Many storage rings use the synchrotron light generated in electron storage rings as a brilliant source of radiation e.g. for material science. While linear accelerators require at least high vacuum pressures, the storage rings need ultra-high vacuum, in very large machines 10^{-11} mbar or below!

Leybold offers excellent knowledge on the material and equipment behavior in hard radiation and within strong magnetic fields. This is mandatory to generate and maintain the insulation vacuum of very large superconducting magnets and to safeguard the required leak tightness.

Products

Oil-sealed and dry compressing vacuum pumps, systems and turn-key solutions


Turbomolecular pumps
TURBOVAC with mechanically suspended and **TURBOVAC i/iX** with hybrid bearing technology

COOLVAC refrigerator cryo pumps

COOLPOWER cold heads for cooling cryo pumps/cryostats

PHOENIX Li helium leak detectors and systems

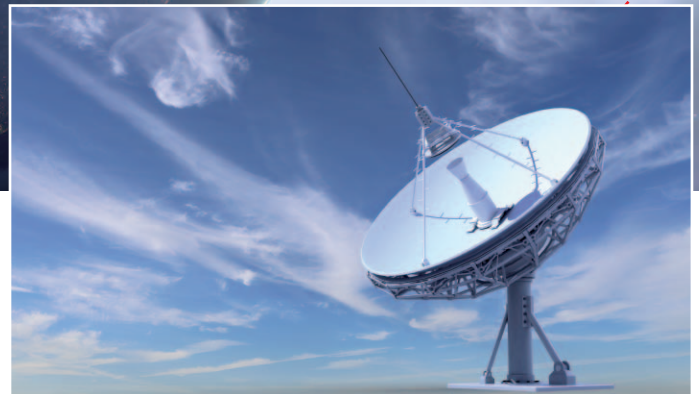




Precisely because space can be considered as the “home of vacuum” both its scientific exploration and technological utilization require the ability to reproduce extreme vacuum conditions on earth.

Space

Space travel, scientific and commercial satellites, extraterrestrial research such as ESA’s Rosetta mission or NASA’s mars rover Opportunity can only be successful if all involved materials, components and devices are successfully tested under high-vacuum and ultrahigh-vacuum conditions. Space simulation chambers vary in size from few liters for testing of e.g. small PCB boards up to several thousand cubic meters to prove space compatibility of complete spacecrafts. However, also terrestrial space observation often requires vacuum, e.g. for mirror coating in telescopes.



Products

COOLVAC cryo pumps

COOLPOWER cold heads

Turn-key vacuum system solutions, tailor-made to individual requirements with integrated fore-vacuum and high vacuum pumps

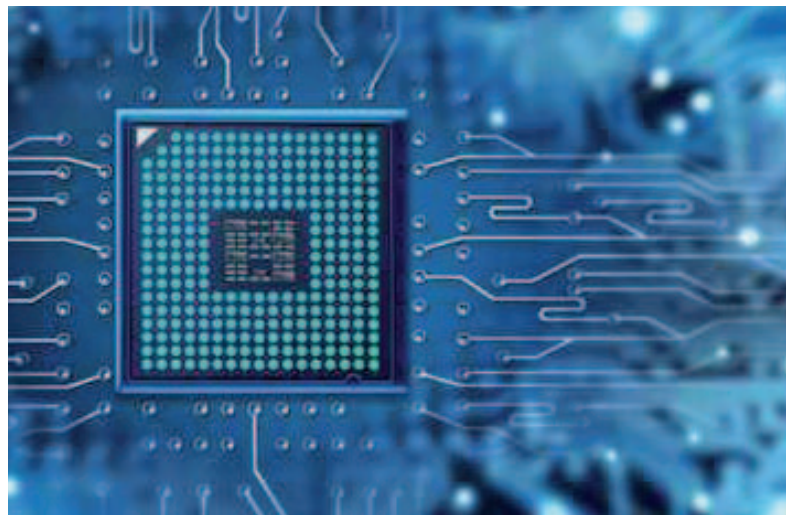
DIP oil diffusion pumps

PHOENIX Li helium leak detectors and systems

UNIVEX S space simulation system

Comprehensive consulting service, customer specific application support and trainings

Our modern life is pervaded by electronics – visibly and invisibly. Most of today's highly integrated circuits in computers, smart phones, cars, home automation, medical technology etc. are based on semiconductor technologies. Also the generation of renewable energy by solar panels is only possible by suitable semiconductor processes. Most of these harsh processes rely on the presence of reliable and stable vacuum conditions.



Electronics

Products

SCREWLIN and **DRYVAC**
dry compressing screw vacuum pumps

TURBOVAC MAG turbomolecular pumps
with magnetic suspension

Analytics

Products

TURBOVAC turbomolecular pumps with mechanical or hybrid suspension

TURBOLAB
high vacuum pump systems

DIVAC diaphragm pumps

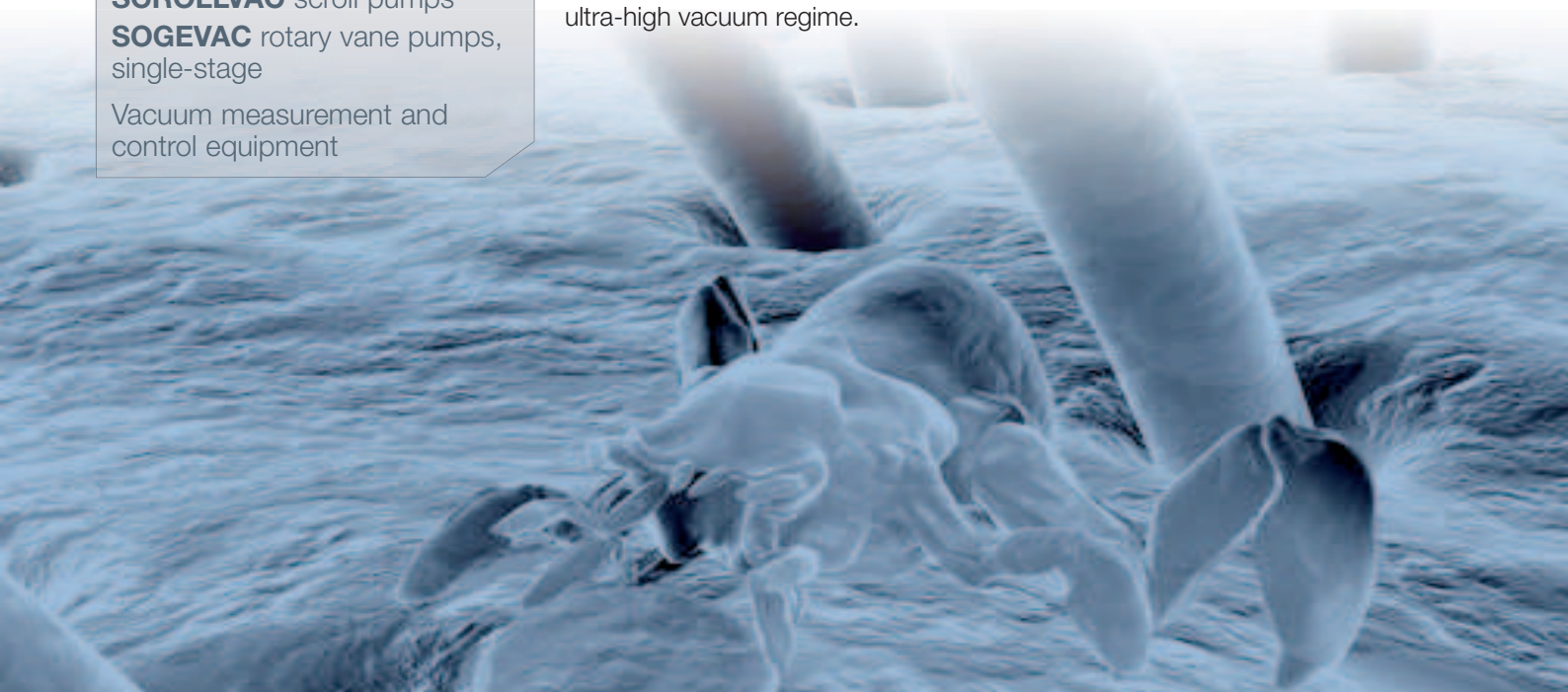
SCROLLVAC scroll pumps

SOGEVAC rotary vane pumps, single-stage

Vacuum measurement and control equipment

Analytical instruments today are a strong driver of product improvements. Be it mass spectrometers for water and food quality control or drug development, x-ray analysis in material quality investigation, electron microscopes in biological and semiconductor research or surface analysis in basic material science – most analytical instruments operate in high or even ultra-high vacuum regime.

Most of these instruments use turbomolecular pumps with mechanical or magnetic bearings. Quality of vacuum composition and high uptime of the vacuum system are mandatory requirements for the operation of analytic instruments.



SOGEVAC / TRIVAC

Rotary vane vacuum pumps

Effective investment, long service life.
No oil loss, low power consumption.

SOGEVAC

- Pumping speed 10 to 1,200 m³/h
- Ultimate pressure $\leq 5 \cdot 10^{-2}$ mbar

TRIVAC

- Pumping speed 2,5 to 65 m³/h
- Ultimate pressure $\leq 5 \cdot 10^{-4}$ mbar



SCROLLVAC

Oil-free scroll pumps

Dry, universal solution, low operating costs.

- Pumping speed 5 to 60 m³/h
- Ultimate pressure $\leq 1 \cdot 10^{-2}$ mbar
- Robust, low-maintenance design
- High pumping speed even at 1000 mbar



LEYVAC

Dry compressing screw pumps and systems

Rugged vacuum pumps for rough applications and high process throughputs.
Simple vacuum performance upgrade with RUVAC roots pumps.

- Pumping speed 80 to 300 m³/h
- Ultimate pressure $\leq 1 \cdot 10^{-2}$ mbar
- Optimized performance for light gases
- Hermetically sealed pump
- Direct connection of RUVAC Roots pumps via adapter



DRYVAC

Dry compressing screw pumps and systems

Rugged, compact vacuum solutions with smart monitoring and control system.

- Pumping speed 450 to 5,000 m³/h
- Rugged, for demanding processes
- Flexible modular system for compact vertical and horizontal installation
- Integrated smart monitoring of major parameters; i-versions with touch screen control and profibus interface



SCREWLINE

Dry compressing screw pumps

Extremely robust for harshest industrial applications, simple on-site maintenance.

- Pumping speed 250 and 630 m³/h
- Ultimate pressure $\leq 1 \cdot 10^{-2}$ mbar
- Monitoring system
- Easy to disassemble pump chamber for rapid cleaning



PT-Systems / TURBOLAB

High vacuum pump systems

Plug-and-play high vacuum pump systems based on well-proven components. Different configurations cover individual vacuum demands.

- Pumping speed 65 - 450 l/s
- Ultimate vacuum down to 10^{-10} mbar
- Completely preassembled as a benchtop unit with turbomolecular pump, frequency converter and fore-vacuum pump
- Control unit for automatic or manual operation optional



TURBOVAC i/iX

Turbomolecular pumps with hybrid bearing technology

Innovative and flexible product range with outstanding performance data and integrated electronics.

- Pumping speed up to 440 l/s
- Oil free hybrid bearings (mechanical/permanent magnetic)
- Integrated electronics including a variety of options for communication and control of accessory components
- Versions for high compression and high gas throughputs available



TURBOVAC

Turbomolecular pumps, mechanically suspended

Reliable and proven product range for demanding applications with separate pump electronics.

- Pumping speed up to 1,150 l/s
- Two oil-free mechanical ceramic bearings
- High resistance to mechanical shocks and shock venting
- Electronics separable with cable lengths > 140 m



TURBOVAC MAG INTEGRA

Turbomolecular pumps, magnetically levitated

Most compact product line for industrial applications. On-board frequency converter and power supply. Easy and space-saving system integration.

- Pumping speed up to 300 - 2,100 l/s
- High compression ratio for all gases
- Holweck stage incorporated
- Resistant to particles and deposits
- Insensitive to shock-venting
- Monitoring and self-protection functions



TURBOVAC MAG digital

Turbomolecular pumps, magnetically levitated

Flexible, vibration-free and low-maintenance turbomolecular pumps with separate frequency converter

- Pumping speed up to 3,200 l/s
- Compound stage versions available
- Stable system performance capability; high pumping speed and high compression ratios for all gases
- Easy system integration
- Temperature management system



UNIVEX

Experimentation and coating systems

Easy operation and accessibility of vacuum chambers. Manual or automatic process control and documentation.

- Multipurpose systems for testing and the production of functional layers
- Modular system configuration, wide range of accessories
- Customized system solutions
- Variable chamber sizes



COOLVAC

Refrigerator cryo pumps

High water vapor pumping capability, long maintenance intervals, installation in any orientation.

- Pumping speed up to 60,000 l/sec
- Clamp and CF flange versions
- Fully automatic regeneration cycle



COOLPOWER

Cold heads for cooling cryo pumps/cryostats

Gas refrigerating machines for cryogenic temperature generation based on the Gifford-McMahon principle. Designed for cooling superconductors.

- Two-stage models down to 8 K, single-stage models down to 25 K
- High refrigerating capacity from the smallest volume
- No need for liquid helium and liquid nitrogen



PHOENIX L300i

Leak detectors and leak testing systems

Designed for the requirements of industrial series production. Well-proven and easy to use in production and quality control programs.

- Suitable for mobile or stationary vacuum and sniffer operation
- Configuration of leak rate, time and type of gas according to customer specifications
- Remote control for wireless operation up to a distance of 100 m



Measuring Instruments

Vacuum gauges and pressure gauges

Reliable monitoring and control for all vacuum processes.

- Measurement with active and passive sensors in a pressure range from 2,000 to 10^{-12} mbar for every application
- Pressure switches and pressure control instruments

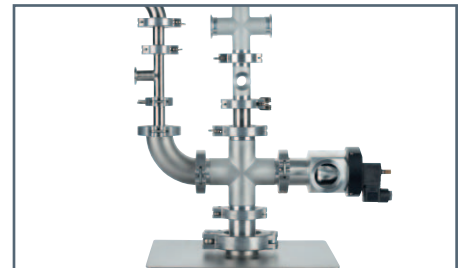


Flange systems

Connection components

Well proven and widely used technology. Almost any connection possible.

- Small flanges in sizes DN 10 to DN 50
- Clamped flanges in sizes DN 63 to DN 630
- CF flanges in sizes DN 16 to DN 250



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