



VACUUM FOR LIFE

PFEIFFER  **VACUUM**



Vacuum technology surrounds us everywhere in our daily lives – although we are often not aware of it. Many products which we take for granted in our lives could not be made without vacuum, which has become a part of our contemporary lifestyle.

No matter what age we are, vacuum technology is everpresent in our daily lives. Infant formula for a baby bottle is freeze-dried under vacuum, and the microprocessors in the consoles that young people play games on are also manufactured under vacuum conditions. In our working lives, we encounter this technology in computers, smartphones and tablets, as well as when we travel by car or by airplane. People who need a pacemaker, or dialysis, or have to take pills, also benefit from the achievements of vacuum technology. People of every age, come into contact with products that could not be manufactured without vacuum.

And that's not all – vacuum is also important for making technological progress and continually improving our standard of living. Numerous projects in research and development need vacuum technology: The use of vacuum is essential in space research experiments and for conducting physical testing, such as surface analysis or new forms of medical treatment, including proton therapy for cancer patients. This also applies for researching innovative forms of transportation and regenerative energy sources.

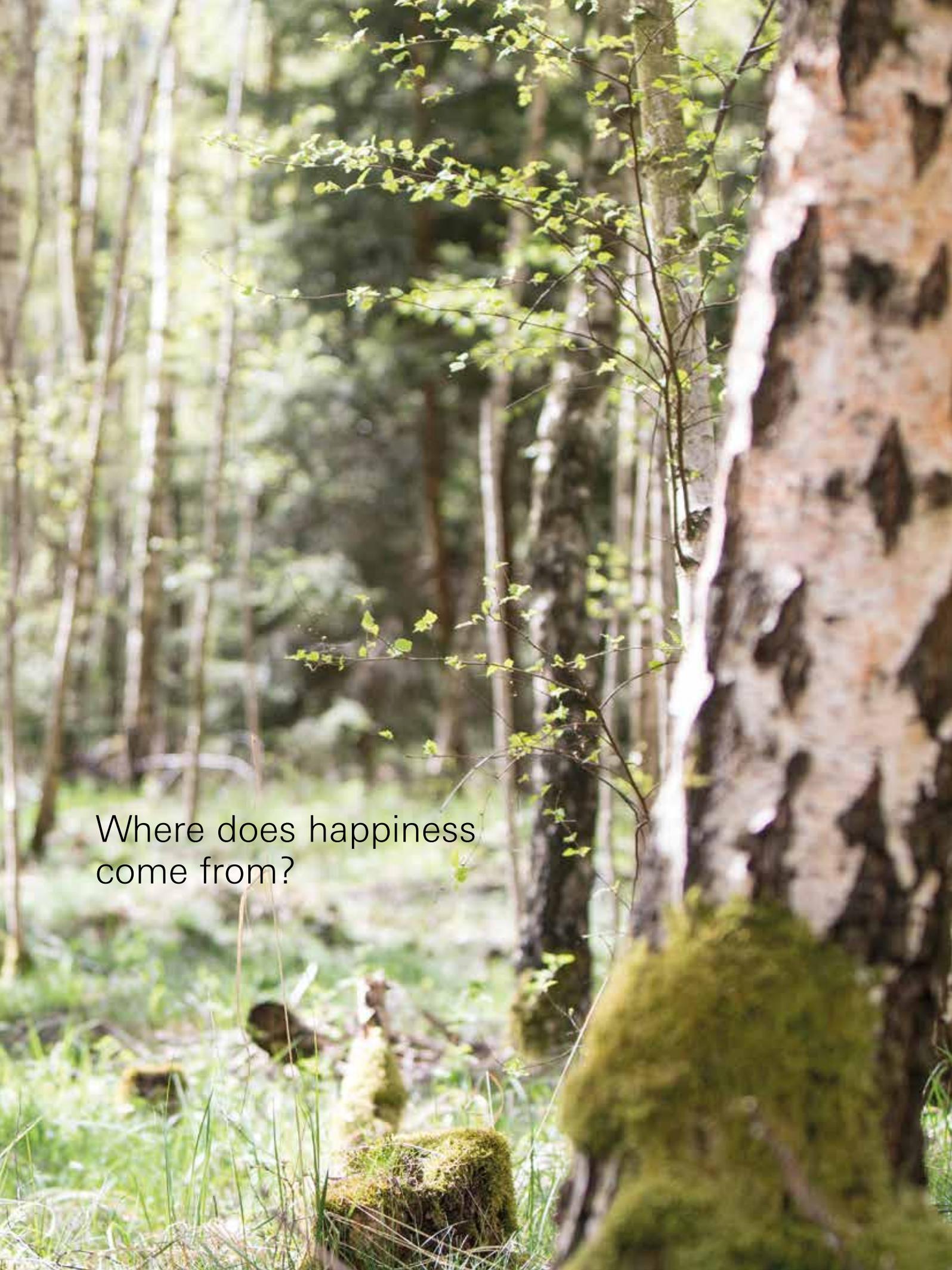
We all need "vacuum for life."



Eyeglasses

Textiles

Pacemaker

A photograph of a forest. In the foreground on the right, a large, textured tree trunk with peeling bark is visible. The background is filled with many thin, vertical tree trunks, creating a sense of depth. The ground is covered in green grass and moss. The lighting is soft and natural, suggesting a sunny day in a wooded area.

Where does happiness
come from?



As we look forward to retirement, we want to enjoy a full and active life. Sometimes we may need some extra help to age gracefully after working many years. And all these, would not exist without vacuum.

In medical technology, vacuum is needed for things such as leak testing

■ **pacemakers** and for plasma sterilization of **surgical instruments**.

Without vacuum technology, the compatibility of implants could not be guaranteed, and it would not be possible to use them in the human body. Processes like these use **leak detectors** such as the **ASM 380, HiPace 80 turbopumps** and dry **ACP Roots pumps**.

■ **Eyeglass lenses** are vacuum deposited with layers of scratch protection, and with reflective, antireflection and colored coatings. These optical coating processes are carried out in systems with custom **vacuum chambers**.

Surface finishing of modern ■ **textiles** takes place under vacuum conditions.

The textiles are given special functional properties to make them water-repellent and airtight. Equipment such as **CombiLine Roots pumping stations** and **turbopumps** are used for this purpose.

Vacuum is also necessary for **pill** production processes. Pills are sometimes produced under vacuum conditions. In addition, airtight packaging is also extremely important for their quality, shelf life and effectiveness. To guarantee these properties, pharmaceutical blister packs are tested to make sure they are airtight. This is what our **AMI 120 test system**, for example, are used for.



ACP 15 multi-stage Roots pump



AMI 120 test system



HiPace® turbopump



TrinosLine chamber



Happiness is found in small moments.

A turbo rotor rotates up to 90,000 times per minute – the leading edge blades of the rotor move as fast as the speed of sound.



Kitchen faucets



Refrigerator

How do we know that it's love?

Drinking water



Nothing in the world is more important to us than our family – that's why we do all we can to safeguard the wellbeing of our loved ones and devote ourselves to look after them. Vacuum technology is an invisible helper in our quest.

The quality and purity of our **drinking water** is tested with mass spectrometers. These analysis instruments conduct measurements in vacuum. Our **PrismaPro®** mass spectrometer, for instance, can be used to analyze water.

Kitchen faucets are vacuum coated with scratch protection and finishing layers. Roots pumping stations such as the ones in our **CombiLine** are used for this purpose.

The cooling circuit in **refrigerators** is tested for leak-tightness with the aid of helium leak detectors, such as our **ASM 340 leak detector**.

Food products such as **milk powder** and **instant coffee** are dried under vacuum. This makes them keep almost indefinitely. **DuoLine rotary vane pumps**, for example, are used for this purpose.

The insulating function of **thermos flasks** is also only made possible through vacuum. Evacuating the space between the inner vessel and outer casing prevents heat or cold from escaping. This keeps our tea and coffee hot for a long time inside the flask. **Rotary vane pumps** such as **HenaLine** are used in the manufacture of thermos flasks, in combination with **Roots pumps** or **turbopumps**.



PrismaPro® mass spectrometer



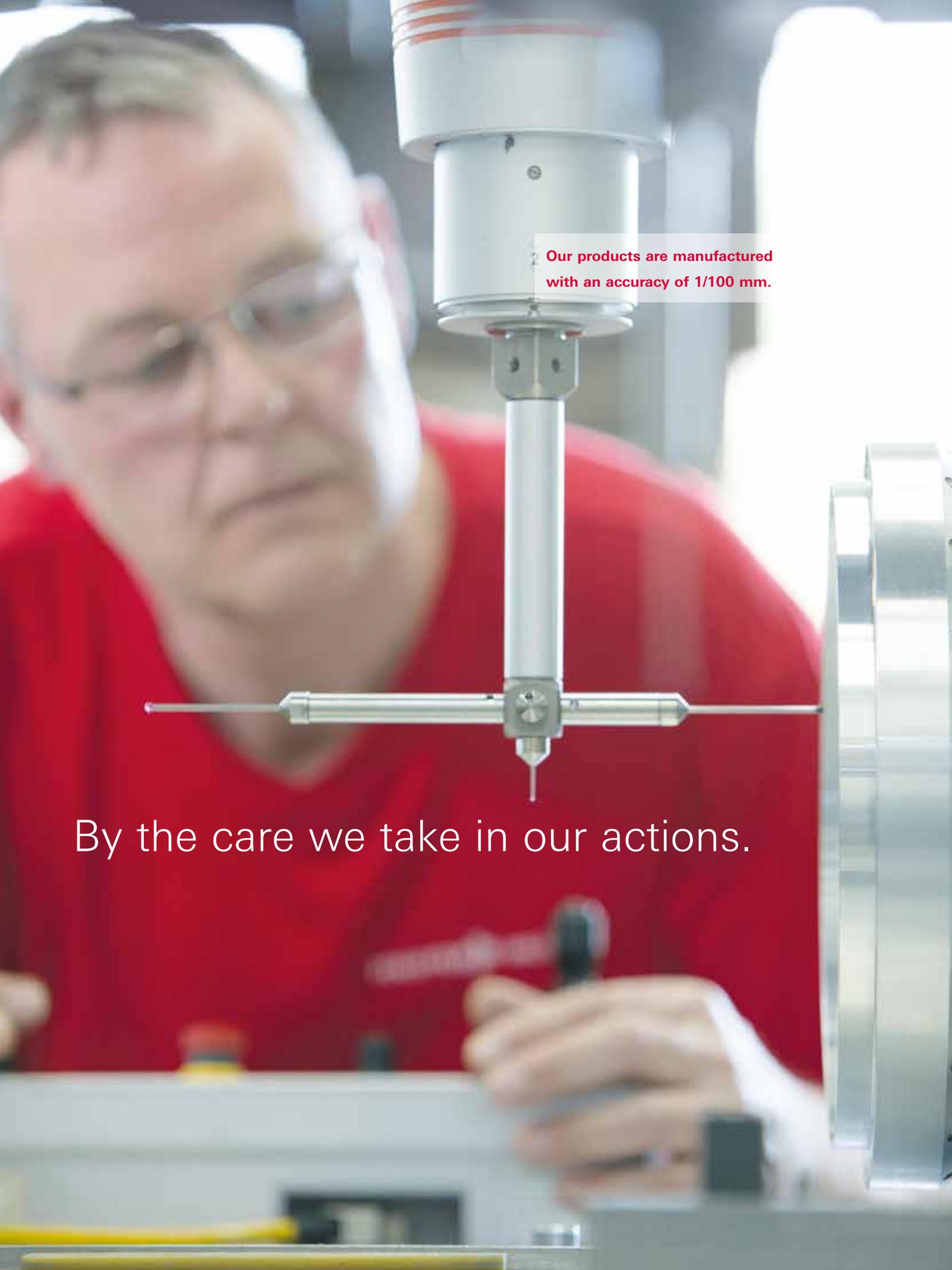
DuoLine rotary vane pump



HenaLine rotary vane pump



ASM 340 leak detector

A man wearing safety glasses and a red shirt is focused on operating a precision machine. The machine has a vertical column with a horizontal arm extending from it. The man is holding a tool or part of the machine. The background is a blurred industrial setting.

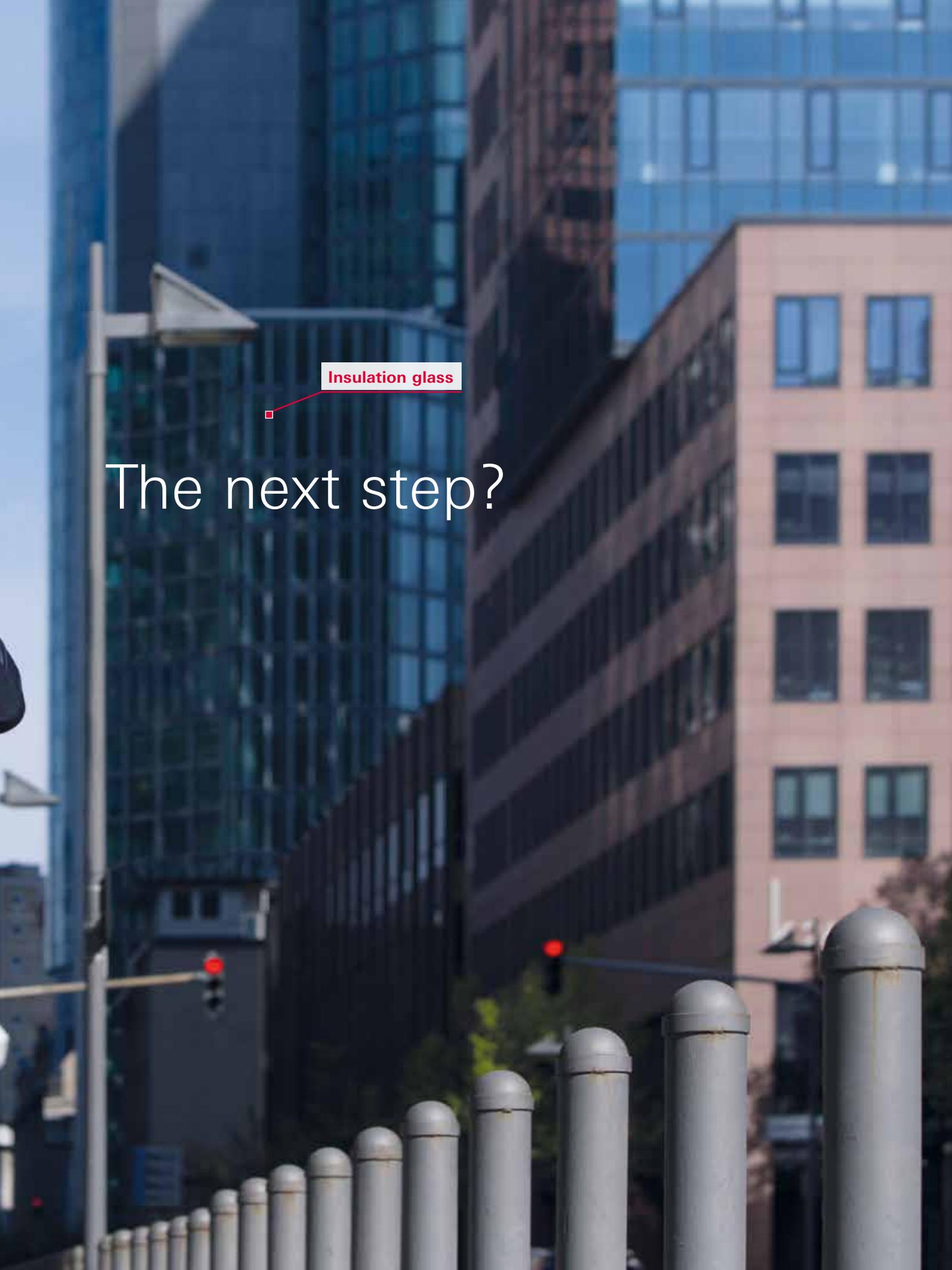
2 Our products are manufactured
with an accuracy of 1/100 mm.

By the care we take in our actions.



Sunglasses

Smartphone

A photograph of a city street with modern buildings. In the foreground, there are several grey, cylindrical bollards. A red callout box with a white border and a red line pointing to a window on a building contains the text "Insulation glass".

Insulation glass

The next step?



In our working life, we encounter a wide range of everyday products that require vacuum in production. Not only at our place of work, but also on our way there:

Microprocessors that are used in modern communication devices such as **■ smartphones or PCs** can only be produced under vacuum conditions. These processes use systems such as **ADPC systems** to monitor and remove process contamination.

The **■ insulation glass** used in glass-fronted buildings, such as office blocks, is vacuum coated with layers of heat and sun protection, as well as coatings influencing light permeability to provide privacy. This coating process, for example, is done with **rotary vane and Roots pumps**, as well as **turbopumps** and **leak detectors**.

Vacuum is also used to coat the lenses of sunglasses with **■ UV protection**. Combinations of **backing pumps** and **turbopumps** are used for this purpose.

People working in large research and development institutes, **universities** and **laboratories** also work with vacuum technology on a daily basis. They place their confidence in the **comprehensive and complete range of solutions** offered by Pfeiffer Vacuum.



ASM 380 leak detector



HiPace® turbopump



OktaLine Roots pump



ADPC contamination management

Ultra-clean conditions are needed to
manufacture semiconductor components –
we detect particles of up to 0.1 μ .

New thinking, new action!





Laptop



Potato chip can

Watch

Plastic bottle

How do we become driven to do something?



Gaming, learning, communicating, chilling out – young people today use digital media increasingly in their spare time thanks to modern communications. Vacuum is essential for this and other forms of entertainment.

Memory chips in **laptops and tablets** are manufactured under vacuum in cleanroom conditions. The screens on these are also coated in a vacuum. Tablets, for example, can be provided with touchscreen features. **Process pumps** from the **A4 range** and **ATH-M turbopumps**, for example, make this possible.

■ **Food packaging** such as potato chip bags are vacuum coated with flexible barriers. These increase their shelf life by preventing moisture and oxygen from getting into the packaging. **DuoLine rotary vane pumps**, in combination with **HiPace turbopumps**, are used for this process.

■ **PET bottles**, too, are vacuum deposited with barrier coats to prevent carbon dioxide, for example, from escaping through the bottle material. **ASM 340-type leak detectors** are used to measure the carbon dioxide loss.

■ **Watches** are coated with decorative layers under vacuum conditions. This surface finish is applied, for example, with **Roots pumping stations** such as **CombiLine** together with **HiPace turbopumps**.



A1504H multi-stage Roots pump



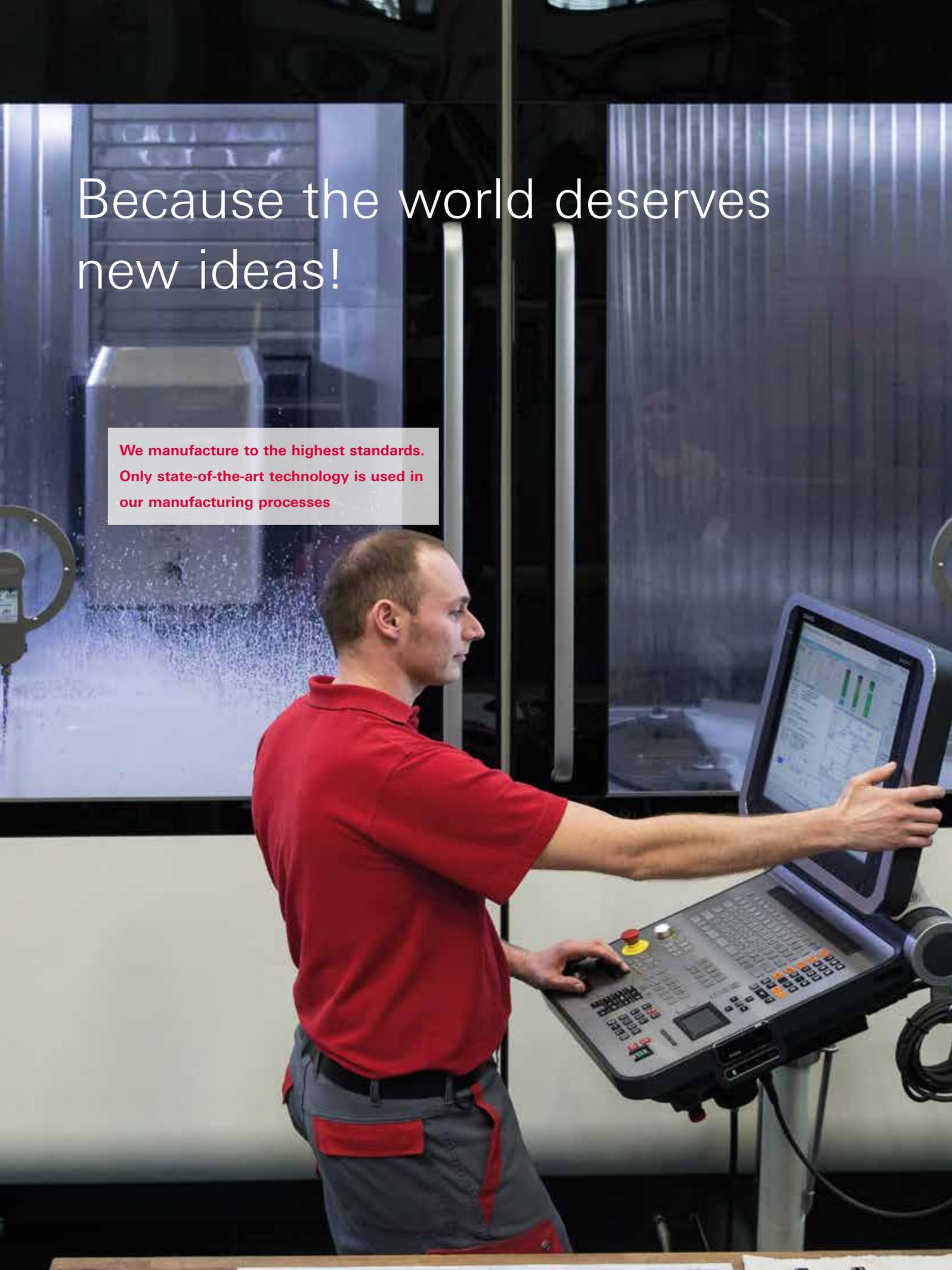
HiPace® turbopump



ASM 340 leak detector



CombiLine Roots pumping station

A man in a red polo shirt and grey work pants is operating a CNC machine. He is standing at a control console with a large monitor displaying a software interface with various charts and data. The background shows the industrial environment of a factory with large windows and machinery.

Because the world deserves new ideas!

**We manufacture to the highest standards.
Only state-of-the-art technology is used in
our manufacturing processes**



Auto parts

Where will the present lead us?

LED light

Painted surfaces





Mobile and flexible – these are features that describe our hectic lifestyle. No matter whether at home or at work, modern forms of transport are here to stay. They need vacuum to even work at all and to get us everywhere safely.

Helium leak detection is used to test the airtightness of a wide range of different **■ auto parts**. Gas tanks, air conditioning hoses, airbags, and injection systems are all subjected to leak testing. In fact, complete **helium leak testing systems** may be used for this purpose.

The **■ LEDs** used in the headlights of cars and bicycles, and in auto dashboards and fittings, are also manufactured using vacuum. The same applies for the components of navigation systems. **Screw pumps** such as the **HeptaDry** and others come into play here.

The **■ painted surfaces** of cars or bicycles are tested under vacuum using plasma weathering. This ensures that they are weather-resistant and temperature-resistant. These processes use equipment such as **Roots pumping stations** from our **CombiLine** and **rotary vane pumps**.

An entirely new technology in the transport sector is **flywheel energy storage** in vacuum. This provides an extremely energy-saving drive system for vehicles and is soon likely to revolutionize transportation as we know it. Pfeiffer Vacuum has developed the **Duo 3 DC rotary vane pump** for this purpose.

In addition, Formula 1 cars will be fitted with **HiPace 10-type turbopumps**. The use of vacuum here allows energy to be recovered during breaking maneuvers.



Leak detection systems for fuel tanks



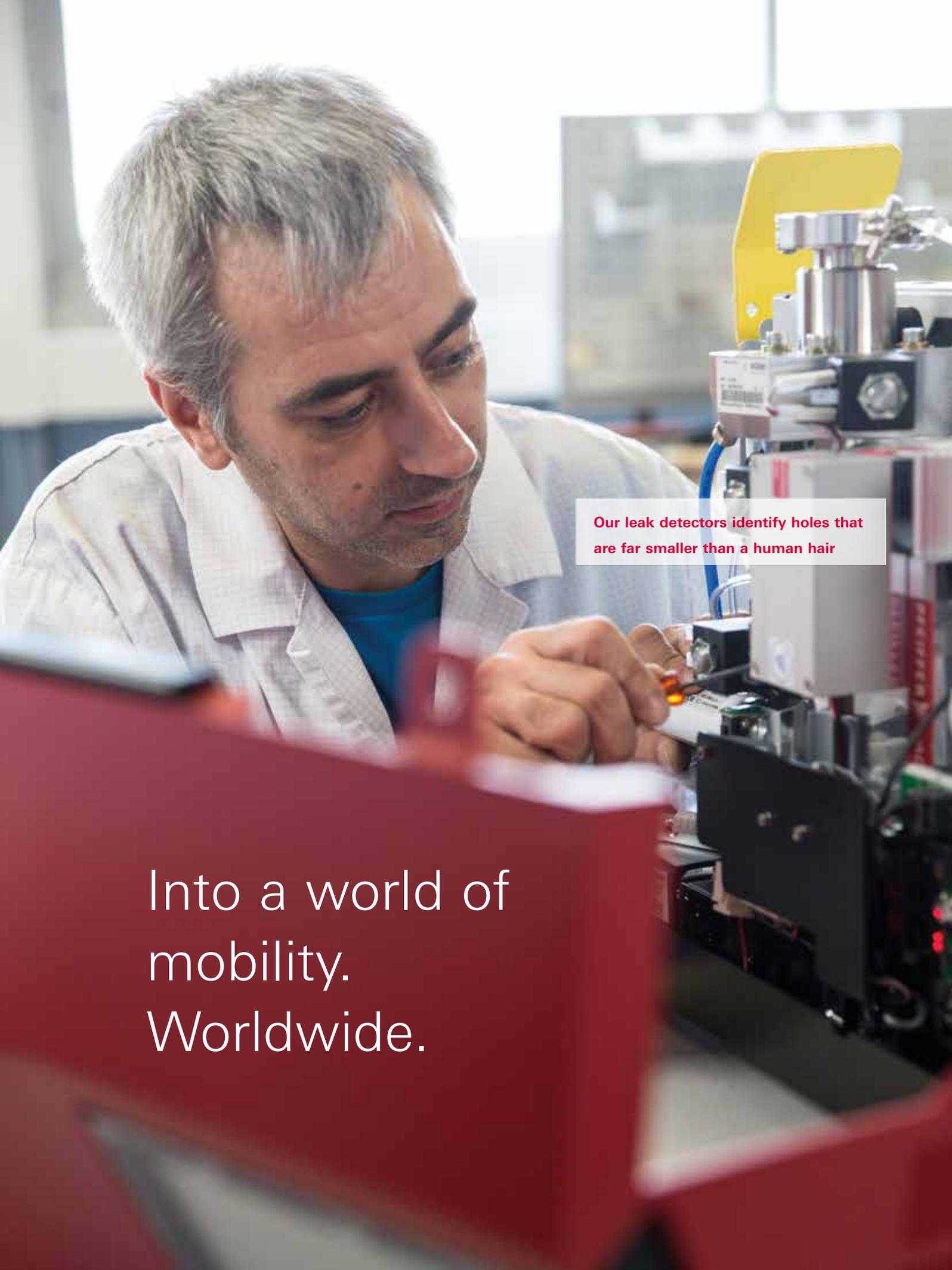
ASM 310 leak detector



HiPace® 10 turbopump

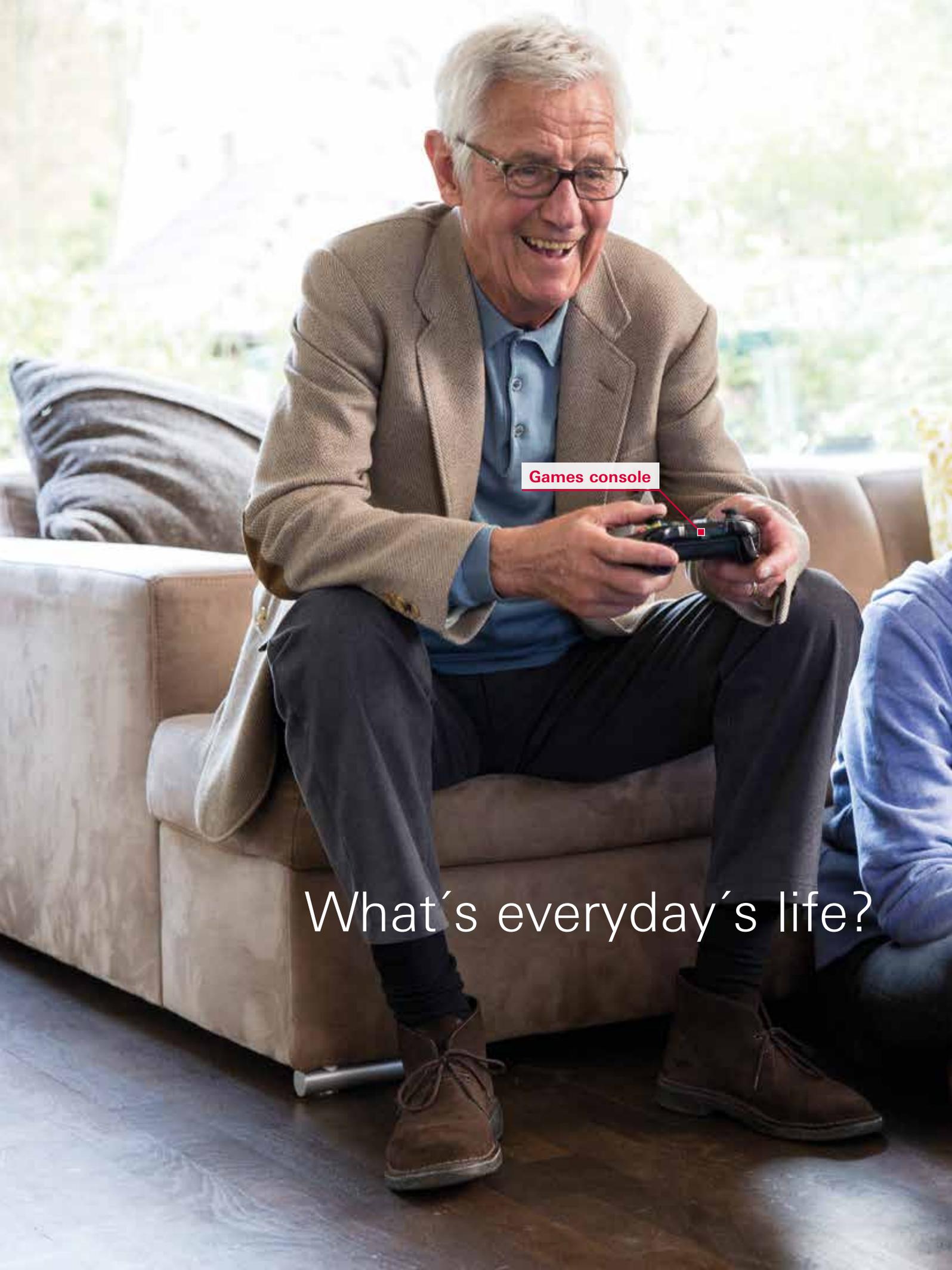


Duo 3 DC rotary vane pump



Our leak detectors identify holes that are far smaller than a human hair

Into a world of
mobility.
Worldwide.



Games console

What's everyday's life?



LED flatscreen

DVD/Blu-ray



It's not just the way we communicate that is affected by new media. What we do in our free time is also changing more and more over the course of time – and not only for the youngest generation. Vacuum plays a decisive role in manufacturing these products:

The processors in **games consoles** contain billions of transistors that are produced under vacuum. **LED flatscreens** also incorporate electronic semiconductor components. They are manufactured using, for example, **HiPace** and **ATH-M turbopumps** and dry **process pumps** from the **A4 range**.

Storage media such as **DVDs, blu-rays**, and **hard-disks** are vacuum coated with layers of metal, using **DuoLine** rotary vane pumps.

In professional sport, Pfeiffer Vacuum **mass spectrometers and gas analysis systems** are used to evaluate doping samples.



ACP 15 multi-stage Roots pump



DuoLine rotary vane pump

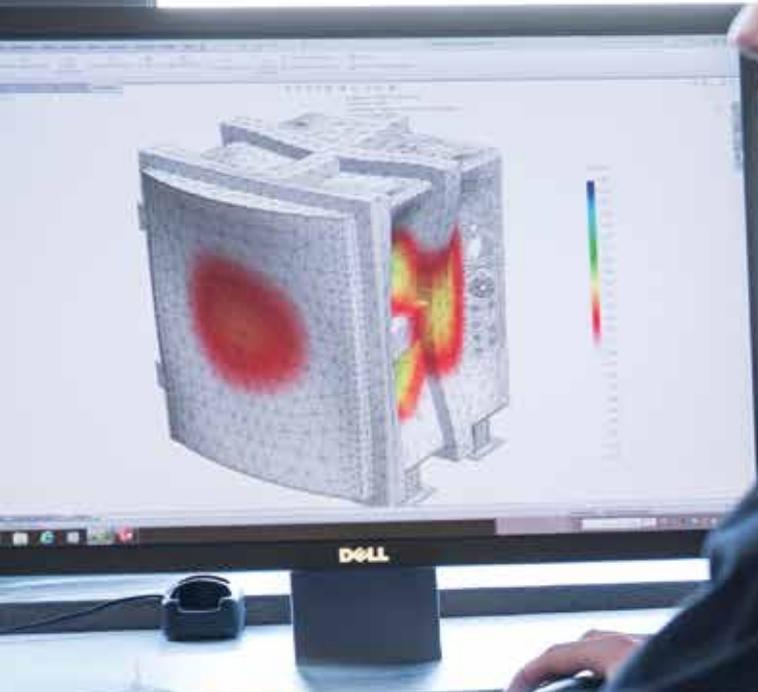


ATH-M turbopump



PrismaPro® mass spectrometer

Even in the design phase, our experts work on the principle of precision, quality and exact tailoring to the customer's needs!



Experience innovations!

Behind all of this,
there's
Pfeiffer Vacuum.



Coated glass

Eyeglasses

Thermos flask

Textiles

Display



LED lights

Flatscreen

Games console

Jewelry

Pacemaker

Wrapping paper



VACUUM FOR LIFE

All this is made possible thanks to **products** crafted each day by Pfeiffer Vacuum **staff** with the maximum **precision** and **care**. Our solutions are used globally for numerous applications in widely ranging systems.

For 125 years now, our name has served as a guarantee for high-end vacuum technology, a **high quality comprehensive solution**, and first-class service. Thanks to close collaboration with our customers and our continuous focus on their needs, we are constantly optimizing and expanding our portfolio. Therefore even in the future, we will always be able to provide our customers with the best possible solution for their particular use. **Durability, reliability, efficiency** and **safety** are key factors here. Proximity to the customer, expertise and passion are the principles underpinning our actions.

You want to learn more about our products? At www.pfeiffer-vacuum.com we provide you with all information about vacuum generation and measurement, analysis, leak detection, chambers and components.



TrinosLine chamber



Inline valve



HiPace® turbopump



ACP 15 multi-stage Roots pump

ndprüfung
nal Tests

Montage Turbopumpen mittel
Mid-size Turbopump Assembly

Endmontage
Final Assembly

Montage Turbopumpen klein
Small Turbopump Assembly

Endmontage
Final Assembly



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
perfectvacuum solution?
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