

Perfection in every detail



► **A clear position:** the name of the sculpture entitled “Development” is a reference to the dynamic development that BINDER has undergone in just a few decades, into what it is today: an innovative enterprise with above-average growth. BINDER pursues a consistent premium brand strategy and aims to secure long-term company independence and to expand its production capacity in Germany.

Why choose BINDER?

What is it that makes a simulation chamber from BINDER a superior product? The technology? The professional advice? Or the impressive after-sales services?

In fact, it's all of these aspects combined. But the overriding argument for choosing a BINDER simulation chamber is its quality and reliability which, once experienced, are difficult to do without. In fact, every product group from BINDER has a particular feature; that certain something that sets it apart from the bulk of similar products and delivers perfection every time.

This brochure offers an introduction to these unique product developments. Learn more about the details that matter – in the laboratory

as well as in everyday life. Also, find out how they contribute to the health and nutrition, life and safety of us all. Each of these details in itself is an answer to our original question.

There is also a shorter answer to the question: over its 30-year company existence, BINDER has developed into the foremost global specialist in the serial production of premium quality simulation chambers for scientific and industrial laboratories. Discover simulation chambers with “character” – real product personalities, made in Germany. By BINDER.



Company founder Peter M. Binder

Company milestones

The history of the entrepreneurial Binder family from Tuttlingen can be traced back to the 19th century.

- 1850 The BINDER brothers open a shoe factory
- 1923 WILHELM BINDER medical and surgical instruments
- 1975 The first hot air sterilisation device is made.
- 1983 Foundation of WTB BINDER Labortechnik GmbH with a range of drying ovens and incubators.
- 1989 Production starts in the first production hall in Tuttlingen.

- 1991 Revolutionary product design for temperature chambers
- 2000 The company changes name to BINDER GmbH and adopts a premium brand strategy with the red triangle as its trademark.
- 2003 A new business segment is introduced: environmental simulation chambers for industrial applications.
- 2005 A new R&D (research and development) centre is inaugurated in Tuttlingen.
- 2011 The company's production capacity is expanded by a surface area of 3,800 m².
- 2013 BINDER's 30th anniversary: The company has 400 employees. The Annual production amounts to 22,000 units, turnover to about 60 million euros.

► **A centre for innovation:** The new research and development centre is the perfect innovation incubator. The temperature regulation and air conditioning systems in the building are as innovative as the BINDER simulation chambers: an exclusive use of regenerative energy sources avoids approx. 70 tonnes of CO₂ emissions every year.

Our scope expertise is vast

Every year, BINDER invests 9% of its turnover in R&D. This is higher than the average, as is the number of technical staff working in the R&D department, including specialists for refrigeration, control and regulation; software and hardware developers, and experts on light, humidity and climate simulation.

The major challenge in their work consists in reconciling a vast number of electronic and mechanical parameters in a highly complex product to optimum effect. The result is first-class accuracy, whether in terms of temperature homogeneity, humidity regulation or light simulation.

To BINDER, this is quite simply an investment in the future. To our customers in scientific and industrial laboratories, the products constitute sheer added value, manifested in the numerous clever details.

An intensive dialogue with users

Research and development at BINDER is far from ivory-towerish. Our patents, innovations and developments are based on close market surveillance and exact analyses of requirements. Moreover, they are the result of an intensive dialogue with users. Sometimes they have developed from close collaborations with large internationally renowned research institutes.

Some of the highlights from the more than one hundred BINDER patents

- APT.line™
the unique concept of Advanced Preheating Technology
- DCT™-refrigeration system
Direct Cooling Technology
- SynergyLight™
illumination cassettes with ICH-compliant illumination
- Light Quantum Control™ LQC
capture of light intensity with spherical 3D ball-type sensors
- PERMADRY™
controlled humidity system in BINDER CO₂ incubators
- GUARD.CONTROL™
personalised access control using RFID
- APT-COM™
process documentation software

We cover a wider range of products

A simulation chamber from BINDER contains around 800 individual parts; with the exact number depending on the specific model. All chambers are made and assembled on site in Tuttlingen. The extraordinarily high vertical integration at BINDER ranges from punching, bending and welding to isolation and assembly. Before delivery, each unit is subjected to rigorous quality controls.

At first glance, it may be difficult to tell one BINDER simulation chamber from another. Technologically, however, they could not be more different. Their construction varies according to whether they will be used in scientific laboratories that demand superior accuracy and safety or in industrial applications that require flexibility, rapid temperature changes and extremely high capacity. BINDER delivers both. It is this expertise that has allowed us to develop many markets and business segments, both in science and in the industry.

Quality, made in Germany

The size of production, advantages of a serial production system and the high quality convince companies, research institutes and laboratories to choose simulation chambers from BINDER. Whether they operate in the automotive or aerospace, pharmaceuticals or chemical, food or electronic industries – established names, brands and market leaders all use chambers with the red triangle in their laboratories. Every customer knows that they can rely on their BINDER simulation chamber.

Areas of use

- ▶ Automotive industry
- ▶ Biotechnology
- ▶ Chemical industry
- ▶ Conductors and semiconductors
- ▶ Human diagnostics
- ▶ In vitro fertilisation (IVF)
- ▶ Cosmetics
- ▶ Aerospace
- ▶ Foodstuffs and beverages
- ▶ Medical research
- ▶ Pharmaceuticals



▶ **Large volumes:**
22,000 simulation chambers leave the BINDER plant in Tuttlingen every year. Here, they are carefully manufactured and rigorously tested to ensure the highest quality, made in Germany.

We're present in 135 countries

Companies that seek international success have to impress decision-makers in many different areas – from their brand quality and product reliability to their technical expertise. BINDER has done just that. Nowadays, 80 per cent of our annual production is exported, because those decision-makers have become customers.

One of the reasons for our global success is our first-rate local consulting service. Experts help customers choose the units that best fit their needs for instance, when conducting material tests in compliance with defined standards. Our international sales and support networks ensure proximity to the customers.

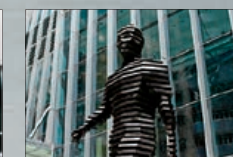
Our service is the personal side of our technical solutions.

In choosing a BINDER simulation chamber, the customer receives much more than just a product. BINDER offers comprehensive service and support – worldwide. Unique within the industry, the BINDER service package offers a substantial added value and includes, among things, a professional validation service to assist customers with their device qualification process.

► **A global player:** In a very short time, BINDER has significantly expanded its international presence. The core markets are still in Europe, but today BINDER generates nearly a third of its turnover in Asia, and is experiencing steady growth in the American market.

BINDER international sales and service organisations

- 2002 BINDER Inc., Bohemia, NY, USA
- 2005 BINDER Russia & CIS, Moscow, Russia
- 2008 BINDER Asia Ltd, Hong Kong, China
- 2009 BINDER Asia, Shanghai, China



► **APT.line™**: it's what you don't see that makes the difference. The patented preheating chamber by BINDER ensures a homogenous air temperature and eliminates turbulence. The hot or cold air enters the inner chamber via openings in the side walls. The absolute temperature homogeneity ensured as a result is impressive.

Our APT.line™ is truly groundbreaking

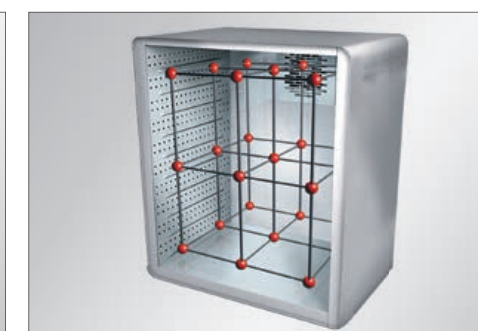
There are many kinds of drying ovens! However, BINDER made the drying oven what it is today – thanks to APT.line™. The patented preheating chamber technology has a unique way of creating homogeneous temperature conditions for the entire test material.

BINDER had the APT.line™ patented back in 1991. The principle is as simple it is ingenious: around the inner chamber of the simulation chamber is a preheating chamber with an integrated heating/cooling system.

Air deflectors allow the air to flow into the inner chamber via openings in the side walls. ensures homogenous temperature conditions. Today, all simulation chambers from BINDER are equipped with APT.line™.



How the APT.line™ works



27-point measurement

So much more than drying ovens

The predecessors of BINDER's current drying ovens were the hot air sterilisers. The evolution of this technology was driven by BINDER and marked the launch of the company in 1983. These days, BINDER makes so much more than just drying ovens and incubators. Every day, our customers discover how versatile the company is, how large it is and how wide its product range is.

Advantages with the APT.line™ technology

- Homogenous temperature
- Identical test conditions throughout the inner chamber
- Optimal convection
- Maximum sensor protection
- Homogenous climate
- Even circulation of air
- High quality standard in accordance with DIN 12880



We open doors to extremely cold places

BINDER ultra-low temperature freezers store real valuables. ULTRA.GUARD™ can hold up to 52,800 samples: biological samples, antibodies or active pharmaceutical ingredients that require long-term storage. The loss of such valuable samples would extend beyond their mere monetary value.

Not only can BINDER provide ultra-low temperature freezing technology down to -86°C ; the company has also developed a world first places: the electronically controlled door mechanism for ultra-low temperature freezers.

This practical door-opening system ensures quick and convenient access to samples by at the touch of a button. You can even open the freezer door with your elbow, if your hands are busy holding a tray. Personalised access control is provided with RFID technology and key cards.



Innovative door-opening mechanism



Safe storage of samples

Top notch security

In terms of security, the ultra-low temperature freezers from BINDER satisfy even the highest of demands. An integrated alarm system signals system failure or sudden drops in temperature both visually and acoustically. If the need should ever arise, BINDER offers round-the-clock breakdown service in many countries; delivering replacement parts or units before damage can occur.

Products

- ▶ ULTRA.GUARD™ ultra-low temperature freezers

Areas of application

- Biotechnology
- Blood bank storage
- Fundamental research/scientific institutes
- Clinics/university hospitals
- Pharmaceutical industry



▶ **Safe storage for valuable samples:** ULTRA.GUARD™ offers maximum security at -86°C for years of storage.



► **Good Laboratory Practice:** BINDER APT-COM™ software ensures tamper-proof data documentation and records temperature and humidity data for a period of 6 months or more. Testing laboratories use it to document test conditions, e.g., for pharmaceutical approvals.



We don't compromise when it comes to long-term testing

How long will drugs or food keep? How do they react to variations in temperature or humidity?

Constant climate chambers from BINDER are ideal for testing these parameters. They ensure stability tests that comply with Good Laboratory Practice (GLP) and the test climate specifications of the ICH guidelines for pharmaceuticals.

Automatic water and waste water management is available to our customers in many

different solutions, such as an external water supply set or BINDER PURE AQUA SERVICE water treatment system.

They are a testament to the know-how that goes into constant climate chambers from BINDER in order to ensure a perfect combination of humidity and temperature.



Careful assembly



Rigorous quality control

Finding the ultimate stress limits

Shelf life and aging are critical in materials testing of paper or plastics, for example. Constant climate chambers are therefore used for long-term tests and to simulate aging processes in freezers or food packaging materials, for example.

Products

- Constant climate chambers
- Dynamic constant climate chambers

Areas of application

- Automotive industry
- Plastics
- Cosmetics
- Food and beverages
- Pharmaceuticals
- Packaging



Our products go from cold to hot in no time at all

What happens if it becomes boiling hot all of a sudden, or when substances are suddenly exposed to freezing cold? How will a mobile phone behave in the tropics, or a printed circuit board in high ambient humidity? How can the function and service life of materials, products and systems be improved?

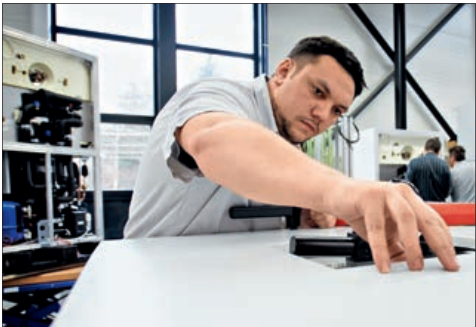
In scientific applications, a tenth of a degree can make all the difference. In industrial materials testing, rapid and extreme temperature changes are more relevant.

BINDER has made good use of the decades of experience gathered in the area

of constant climate – with strict requirements for accuracy and compliance with standards – while developing solutions for alternating climate applications in the industry. In the last decade, the company has thus managed to tap into completely new markets.



Absolute accuracy



An eye for the essential

A wide range of applications

With a temperature range from -70°C to +180°C and relative humidity of up to 98%, almost any environmental conditions can be simulated in accordance with international standards. This is something that has made many companies choose BINDER – particularly in the automotive and electronics industries.

Products

- ▶ Hot/cold test chambers
- ▶ Climate test chambers
- ▶ Ultra-low temperature material test chambers

Areas of application

- Automotive industry
- Conductors and semiconductors
- Plastics
- Aerospace
- Metal industry/mechanical engineering

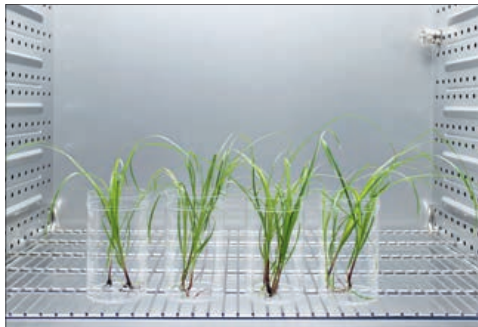


▶ **Perfect visibility:** BINDER environmental chambers offer a clear view of the material or components being tested, thanks to a heated viewing window and LED illumination.



We control many aspects of light

To what extent are drugs or cosmetics photostable? How do food react to light? Industries involving pharmaceuticals or food for example (including those studying plant or insect growth), rely on the perfect balance of temperature, humidity and light.



Perfect growth conditions



SynergyLight™ being assembled

In order to use or study these and many other effects of light, homogenous light conditions are necessary in addition to the temperature and humidity simulation. BINDER developed SynergyLight™ for exactly this purpose. It provides the optimal conditions for IHC-compliant pharmaceuticals and foodstuffs testing.

Exact measurements with LQC sensors

In the pharmaceutical industry, ICH requirements stipulate extreme illumination of up to 1.2 million lux hours and UV energy of 200 watt hours per square metre. Here, the photostability of drugs is simulated behind a windscreen in certain cases. The patented Light Quantum Control (LQC) sensor, which resembles a golf ball, measures the light intensity of the radiation and reflection directly on the samples – with more accuracy than any other method.

Products

- ▶ Constant climate chambers with illumination
- ▶ Growth chambers

Areas of application

- Cosmetics
- Foodstuffs and beverages industry
- Plant/insect growth
- Pharmaceutical industry
- Packaging



▶ **Rays of light:** SynergyLight™ radiates a mix of bright white and UV light, which is evenly distributed in the chamber. Highly accurate LQC 3D spherical sensors measure light intensity.

We provide the conditions for optimal cell growth

How does microgravitation affect the cell reactions in salmonella infections? Do stem cells from mice develop differently in outer space and on earth? What are the optimal conditions for successful in vitro fertilisation?

For these and other highly complex areas of research, in which life itself is studied using cell and tissue cultures, optimal and reproducible growth conditions are essential. The CO₂ incubators from BINDER provide such conditions.

A number of proprietary developments from BINDER come into play in the incubators. Examples include: the patented gas mixing head, the intelligent fail-safe and the drift-free CO₂ infrared measuring system, which ensures pH stability. The Permadyr™ system ensures a condensation-free inner chamber up to and including hot air sterilisation at 180°C, which eliminates any germs or spores.



Consistent production



for demanding applications

Avoiding contamination and saving time and money in one fell swoop

BINDER CO₂ incubators are technological masterpieces. Thanks to the deep-drawn inner chamber, the surfaces become smaller and the risk of contaminants accumulating is reduced. Instead of shelf systems that take time and effort to install and dismantle, as well as to clean, BINDER has opted for integrated shelf supports and easily removable fittings. What's more, BINDER CO₂ incubators do not require any consumables, such as chemicals, filters or UV lights.

► **Less is more:** The seamless, deep-drawn inner chamber made of stainless steel offers no hold for germs. Add 180°C hot-air sterilisation and the conditions for optimal cell culture are met.

Products

- CO₂ incubators

Areas of application

- Biotechnology
- Biological tissue engineering
- In vitro fertilisation (IVF)
- Clinics/university hospitals
- Medical research

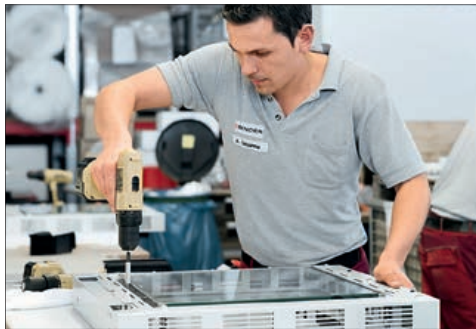


We are able to dry flammable or heat-sensitive substances under completely safe conditions

When it comes to drying heat-sensitive or flammable substances, BINDER vacuum drying ovens – which work fast, gently and without leaving residue at low temperatures – offer optimum drying results.



Ideal for drying powder, among other things



Safety glass panel and flame protection gasket

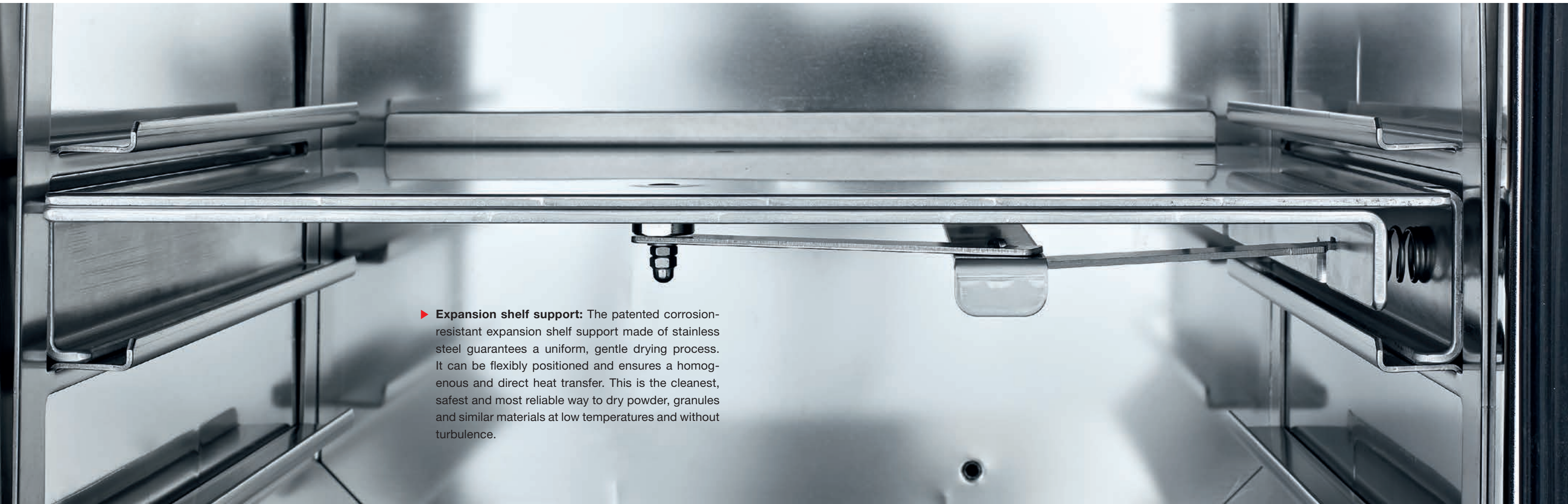
These ovens are equipped with a spring-mounted safety glass panel with proved shatter protection. A patented flame protection gasket seals the chamber from the outside. The electronic components are decoupled from the inner chamber, and are available in an explosion-proof version which meets the exacting ATEX standards.

In short, the vacuum drying ovens from BINDER boast a unique safety concept, which was developed for substances that require particularly gentle drying. BINDER vacuum drying ovens provide the optimal conditions for it.

We listened to the market and put our ovens at eye level

Safety is one thing, suitability for everyday use and ergonomics another. BINDER offers a base for the vacuum drying ovens, consisting of a vacuum module in which the noise from the running vacuum pump is dampened. When installed on top of this vacuum module, the vacuum drying oven is easier to load and unload, and the drying status can be checked at a glance.

Products	Areas of application
▶ Vacuum drying ovens	Chemistry
▶ Safety vacuum drying ovens	Conductors and semiconductors
	Surface engineering
	Pharmaceutical industry



▶ **Expansion shelf support:** The patented corrosion-resistant expansion shelf support made of stainless steel guarantees a uniform, gentle drying process. It can be flexibly positioned and ensures a homogenous and direct heat transfer. This is the cleanest, safest and most reliable way to dry powder, granules and similar materials at low temperatures and without turbulence.

We point the way and recognise extraordinary achievements

The commitment to our social responsibility is part of our corporate philosophy. Those who promise the best conditions and make a significant contribution to health, nutrition, safety and product quality, are aware of their scientific, environmental and social responsibility. BINDER gladly assumes this responsibility.



Promotion of life science research



Our cells and their genetic code hold the key to curing diseases, protecting life and better understanding human beings. Every tiny building block that can shed some light in this area deserves our attention. The best ones deserve a sign of recognition. The BINDER innovation prize has been awarded since 1998 in recognition of outstanding work in fundamental research on cell biology. The prize is awarded every year by the German Society for Cell Biology.

The university for a place with a future



BINDER is the initiator and main sponsor of Tuttlingen University Campus, which was founded in 2005. Mentor programs, internship semesters and out-house laboratories specially built for students in the company offer the specialists of tomorrow the best possible future prospects.

Helping children with diabetes



BINDER has supported the Dianño Foundation for several years and became an official sponsor in March 2012. The foundation seeks to help children with diabetes and their families quickly with advice on everyday life problems, by providing diabetes nursing services via a special nanny network available across Germany and by offering those affected by the disease persons the opportunity to recharge their batteries on retreats.

The best conditions – even for the environment



As an Alliance Member of Blue Competence, BINDER supports the initiative of the VDMA (Verband Deutscher Maschinen- und Anlagenbau – German Engineering Federation) to protect the environment and use resources carefully by means of innovative technologies. Among other things, BINDER leads the way by using only recyclable packaging materials and avoiding environmentally harmful cleaning methods. Continuous optimisation of manufacturing processes, stringent supplier selection in accordance with the Ecodesign directive and a continually reduced consumption of resources are examples of other contributions to environmental sustainability.

The entire line at a glance

They come in all shapes and sizes: With temperatures from -86°C to 300°C. With or without hot air sterilisation. With illumination; with humidity. For drying, storing or materials testing. For use in research or industrial applications. Very accurate or extremely fast. But whatever the type, they're all safe, reliable and durable. Simulation chambers from BINDER – are as diverse as life itself.

- ▶ CO₂ incubators
- ▶ Incubators
with mechanical or gravity convection
- ▶ Cooling incubators
with compressor or Peltier cooler
- ▶ Growth chambers
with illumination and/or humidity
- ▶ Ultra-low temperature freezers
- ▶ Drying/heating ovens
with mechanical or gravity convection
- ▶ Temperature test chambers
- ▶ Vacuum drying ovens
- ▶ Safety drying ovens
- ▶ Constant climate chambers
with illumination or photometry
- ▶ Hot/cold test chambers
- ▶ Climate test chambers



Read more about our product series at www.binder-world.com

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