



BINDER Scientific Product catalog

 **BINDER**
Best conditions for your success

Архангельск (8182)63-90-72
Астана +7(7172)727-132
Белгород (4722)40-23-64
Брянск (4832)59-03-52
Владивосток (423)249-28-31
Волгоград (844)278-03-48
Вологда (8172)26-41-59
Воронеж (473)204-51-73
Екатеринбург (343)384-55-89
Иваново (4932)77-34-06
Ижевск (3412)26-03-58
Казань (843)206-01-48



Калининград (4012)72-03-81
Калуга (4842)92-23-67
Кемерово (3842)65-04-62
Киров (8332)68-02-04
Краснодар (861)203-40-90
Красноярск (391)204-63-61
Курск (4712)77-13-04
Липецк (4742)52-20-81
Магнитогорск (3519)55-03-13
Москва (495)268-04-70
Мурманск (8152)59-64-93
Набережные Челны (8552)20-53-41

Нижний Новгород (831)429-08-12
Новокузнецк (3843)20-46-81
Новосибирск (383)227-86-73
Орел (4862)44-53-42
Оренбург (3532)37-68-04
Пенза (8412)22-31-16
Пермь (342)205-81-47
Ростов-на-Дону (863)308-18-15
Рязань (4912)46-61-64
Самара (846)206-03-16
Санкт-Петербург (812)309-46-40
Саратов (845)249-38-78

Смоленск (4812)29-41-54
Сочи (862)225-72-31
Ставрополь (8652)20-65-13
Тверь (4822)63-31-35
Томск (3822)98-41-53
Тула (4872)74-02-29
Тюмень (3452)66-21-18
Ульяновск (8422)24-23-59
Уфа (347)229-48-12
Челябинск (351)202-03-61
Череповец (8202)49-02-64
Ярославль (4852)69-52-93

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BINDER – The company

| Best conditions for your success

BINDER is a family business dedicated to simulation chambers. We are the world's largest specialist in simulation chambers for the scientific and industrial laboratory.

More than 23,000 units leave our plant in Tuttlingen annually.

Proven cutting-edge technologies, pioneering innovations and absolute precision characterize the BINDER brand image. Our focus lies in the perfect simulation of biological, chemical and physical environmental conditions for a number of industries. Our logo's three red triangles stand for: superior products, best service package and professional consultation. Our tagline embodies these values by providing: *"best conditions for your success"*.

In addition to our range of products, we offer our customers a comprehensive selection of options and accessories, making it possible to optimize standard units to your requirements profile. BINDER INDIVIDUAL offers flexible solutions adapted to the customer's particular requirements.

Whatever requirements may be, we can support and guide you locally from our headquarters in Tuttlingen and from our four BINDER offices in New York, Moscow, Hong Kong and Shanghai, as well as through our sales partners in more than 135 countries.



BINDER – Environmental responsibility

| Good for you. Good for the environment.

For nearly three decades, we have been offering more to our customers: more innovation, safety and local support. This is also the case for the environment. We take into account ecology and sustainable environmental protection not only in the development and production of our chambers, but in everything we do as a company.

With this in mind, BINDER is committed to use material combinations that can be separated to enable recycling. This is why asbestos or mercury are not used in any BINDER chamber today or will ever be in the future. We consciously choose synthetic materials made of recycled resin in our manufacturing process without any compromise in quality.

- ▶ **Less energy consumption** – The geothermal heating system at the Research & Development Center has a transmission heat requirement of 40 % below that required by the German Energy Saving Ordinance (EnEV). Daylight harvesting system: large windows allow optimum use of daylight supported by daylight-dependent automatic blinds; green roof for heat insulation; energy savings by the use of state-of-the-art equipment and systems and adaptive lighting systems. We are dedicated to reducing energy consumption which is why a combined heating and power station is in planning.
- ▶ **Stringent selection of suppliers in accordance with the European Ecodesign Directive** – Reusable packaging with upstream suppliers is used whenever possible. Materials such as steel, plastics, cardboard and paper are consistently recycled. Renewable and recycled materials are given preference wherever possible.
- ▶ **Less environmental impact** – The extensive oil-free steel processing performed with automatic machines allows BINDER to dispense with cleaning procedures detrimental to the environment before surface coating. Only solvent-free powder coating systems are used at BINDER.
- ▶ **Less resource consumption** – Use of up to 100 % recyclable packaging; 98 % powder reprocessing thanks to closed circuit coating system; 70 % less paper consumption thanks to digital workflow.

URKUNDE
der
Deutschen Gesellschaft
für Züchtung
von
BINDER Innovations-Preis 2011
Herrn Univ.-Prof. Dr. rer. nat. Christian Seifert
für seine herausragenden Leistungen
auf dem Gebiet der
Reproduktion für Pferde, insbesondere bei Hengstmanagement



BINDER – Research and progress

The BINDER Innovation Prize: An excellent idea.

Since 1998, the BINDER Innovation Prize has been awarded annually by the German Society for Cell Biology (DGZ). The prize is endowed by BINDER. It is awarded to candidates for their outstanding work in the field of basic cell biology research.

With this award, BINDER commits to the continuous advancement of life sciences and deepens its close cooperation with members of the science and research community. Especially for projects involving cell culture, BINDER is an ideal partner for the realization of sophisticated endeavors.

- | | |
|---|--|
| <p>1998 Dr. Ronald Frank, <i>Society for Biotechnological Research Braunschweig</i>, for his work in the field of SPOT analysis</p> | <p>2005 Prof. Frauke Melchior, <i>Georg-August-University, Göttingen</i>, for her work in the field of regulating cellular processes through ubiquitin-related proteins of the SUMO family</p> |
| <p>1999 Dr. Ludger Fink, <i>Institute for Pathology at the Justus Liebig University of Giessen</i>, for his work on mRNA analysis according to laser-assisted cell-picking from complex tissues</p> | <p>2006 Prof. Dr. Ivan Dikic, <i>University Frankfurt/Main</i>, for his work: "Ubiquitin and Ub-like modifiers in the heart of cell signalling"</p> |
| <p>2000 Dr. Maria Wartenberg and Dr. Heinrich Sauter, <i>Institute for Neurophysiology in Cologne</i>, for their work: "Thalidomide inhibits angiogenesis in embryoid bodies by the generation of hydroxyl radicals"</p> | <p>2007 Dr. Jan-Michael Peters, <i>Research Institute of Molecular Pathology, Vienna</i>, for "Regulation of sister chromatid cohesion in mammalian cells"</p> |
| <p>2001 Dr. Nicole Maas-Szabowski and Dr. Axel Szabowski, <i>German Cancer Research Center in Heidelberg</i>, for their in-vitro research on the complex interactions between the human subcutis and cutis</p> | <p>2008 Prof. Dr. Heinrich Leonhardt and Dr. Ulrich Rothbauer, <i>Ludwig Maximilians, University Munich BioCenter, Department of Biology</i> for their work: "Targeting and tracing antigens in living cells with fluorescent nanobodies"</p> |
| <p>2003 Dr. Thomas Korff and Prof. Hellmut Augustin, <i>Cancer Biology Clinic in Freiburg</i>, for fundamental research on an in-vitro model of the endothelium differentiation and blood vessel formation (angiogenesis)</p> | <p>2009 Prof. Dr. Ludger Hengst, <i>Medical University of Innsbruck</i>, for his work in protein research, with the topic: CDK-Inhibitors – connecting signal transduction and cell cycle control</p> |
| <p>2004 Dr. M. Christina Cardoso, <i>Max-Delbrück Center for Molecular Medicine (MDC) Franz-Volhard-Klinik, Berlin</i>, for her work: "A look at genome duplication in living cells and the development of cell cycle markers"</p> | <p>2010 Prof. Anne Spang, <i>University of Basel</i> for her work: Intracellular transport in yeast</p> |
| | <p>2011 Prof. Dr. Christian Behl, <i>Institute for Pathobiochemistry, Johannes Gutenberg University Mainz</i> for the study of the biochemistry of aged cells in conjunction with the course of neurodegenerative processes</p> |



Growth

| Always the right conditions

Precise adherence to the pre-selected values for temperature, humidity, CO₂, O₂ and light as well as reliable reproducibility of growth conditions are the two most important requirements for simulation chambers. On the other hand, they should make documenting your work with living organisms as easy as possible.

BINDER is aware of these requirements and works continuously to provide you with the perfect CO₂ incubators, microbiological incubators and growth chambers. Our product range offers innovative technical solutions and comprehensive equipment options. We can also meet special technical requirements through BINDER INDIVIDUAL.





BINDER

STERILIZATION
180 °C

• • • • •

• • • • •

Cell and tissue cultures

C | CB series

Absolutely superior: BINDER CO₂ incubators

- ▶ Absolute stability
 - ▶ Reproducibility of the best culture conditions
 - ▶ High temperature uniformity provided by the APT.line™ preheating chamber
 - ▶ Saturated relative humidity up to 95 % r. H.
 - ▶ Stable pH values thanks to drift-free CO₂/ O₂ IR sensor technology
- ▶ Absolute reliability
 - ▶ Reliable decontamination concept
 - ▶ Validated and recognized 180 °C hot air sterilization routine
 - ▶ Condensation-free interior due to Permadyr™
- ▶ Absolutely clean
 - ▶ Reduction of interior contaminable surface to a minimum
 - ▶ Easy-to-clean interior

The BINDER CO₂ incubators ensure optimal and reproducible growth conditions for your cultures. The proven APT.line™ preheating chamber and Permadyr™ eliminate the risk of condensation. You can depend on hot air sterilization at 180 °C, to eliminate bacteria and spores. The unique seamless, deep-drawn chamber without obstructions makes cleaning the chamber simple. The CO₂ incubators of the C and CB series offer you all these benefits standard for successful cell and tissue cultivation standard.



Cell culture



Tissue engineering



In vitro fertilization

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The standard for CO₂ incubators

C series

The C 150 series ensures optimal growth conditions up to 50 °C. With a highly effective decontamination concept, it meets all basic requirements for cell and tissue cultures. A choice of options allows for an incubator configuration based on the application requirements.



► C 150 model



150

Available size (liters)

► EQUIPMENT

- Temperature range 7 °C above ambient temperature to 50 °C
- Hot-air sterilization at 180 °C
- Microprocessor with LED display for temperature and CO₂ concentration
- Various alarm and status displays
- Automatic diagnostic system with visual and audible alarm, as well as zero-voltage relay contact for central monitoring
- Drift-free infrared CO₂ measurement system
- Seamless, deep-drawn inner chamber made of stainless steel with integrated shelf support system
- Water pan
- Independent temperature safety device class 3.1 (DIN 12880) with visual and audible temperature alarm
- Gas mixing head
- Tightly-fitted inner glass door
- Door lock
- Door hinged right or left
- Units are stackable
- Three perforated shelves, stainless steel

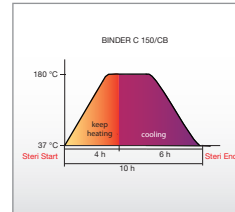


► C SERIES | BEST GROWTH CONDITIONS:



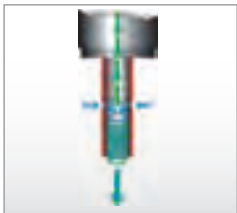
Uniform growth conditions

- APT.line™ preheating chamber
 - Homogeneous temperature distribution
 - Exact temperatures at all levels
- High humidity at 95 % r. H.
 - Minimizes the risk of evaporation



Reliable decontamination

- 180 °C hot-air sterilization
 - Complete elimination of contaminants
 - Automatic sterilization cycle
 - Globally recognized method



Stable pH value

- Drift-free CO₂ sensor technology
 - Gas mixing head ensuring an homogeneous CO₂ distribution
 - Homogeneous conditions quickly attained



Easy cleaning

- Seamless, deep-drawn inner chamber
 - High-quality stainless steel materials
 - Minimization of contaminable surface
 - Time-saving manual cleaning

► **OPTIONS**

- Access ports of various diameters with silicone plug
- Perforated rack, stainless steel
- Gas cylinder connection set
- Analog outputs 4 – 20 mA for temperature and CO₂ measurements
- BINDER Gas Supply Service (external gas tank changer)
- Stacking adapter
- Base on casters
- Calibration certificate for temperature and CO₂
- Temperature measurement according to DIN 12880



Base on casters



Silicone access port with two silicone plugs



Gas Supply Service



CO₂ incubator with integrated turning gear

► **BINDER
INDIVIDUAL**
More information
on page 133

Technical data for your planning and installation

C series



C 150

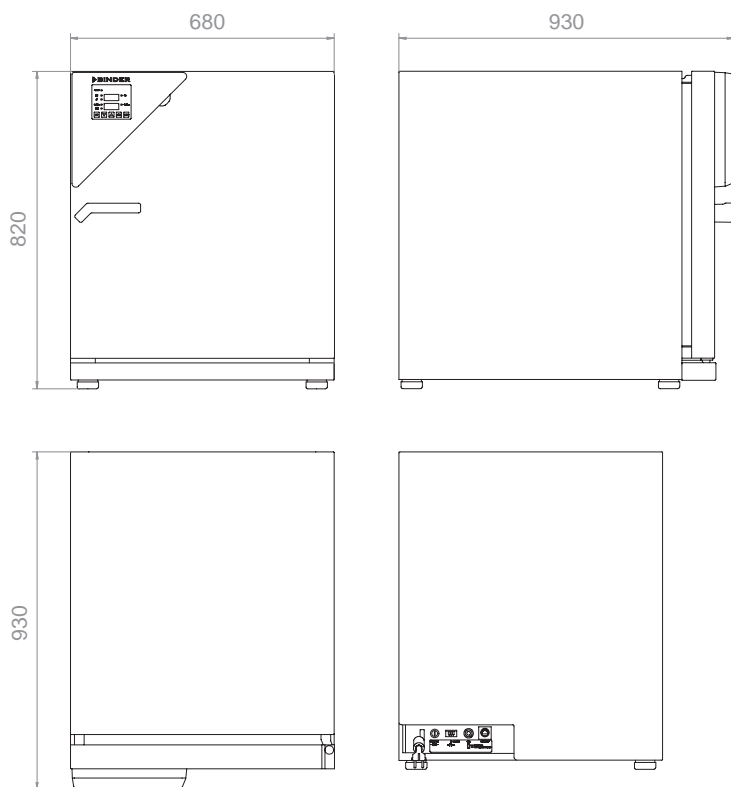
Exterior dimensions	
Width (mm/inch)	680 / 26.77
Height (including feet) (mm/inch)	820 / 32.28
Depth (mm/inch)	815 / 32.09
plus i-triangle, door handle, connections (mm/inch)	105 / 4.13
Interior dimensions	
Width (mm/inch)	500 / 19.69
Height (mm/inch)	600 / 23.62
Depth (mm/inch)	500 / 19.69
Interior volume (l/cu.ft.)	150 / 5.4
Perforated shelves (no. standard/max.)	3 / 6
Weight (empty) (kg/lbs.)	95 / 210
Temperature data	
Temperature range, 7 °C / 12.6 °F above ambient up to °C/°F	50
Temperature uniformity at 37 °C / 98.6 °F (±K)	0.4
Temperature fluctuation (±K)	0.1
Recovery time after door was opened for 30 sec ¹⁾ at 37 °C / 98.6 °F (min)	5 / 122
CO₂ data	
CO ₂ range (Vol.-% CO ₂)	0 – 20
Setting accuracy (Vol.-% CO ₂)	0.1
Recovery time after door was opened for 30 sec ¹⁾ up to 5 vol. % (min)	7
CO ₂ measurement	IR
Humidity data	
Humidity average value (% r. H.)	95 ±2
Electrical data	
IP system of housing protection acc. to EN 60529	IP 20
Nominal voltage (±10 %) 50/60 Hz (V)	230
Nominal power (kW)	1.4
Energy consumption ²⁾ at 37 °C / 98.6 °F (Wh/h)	110
Model no.	9040-0078

¹⁾ to 98 % of the set value. The recovery times of the gas concentrations inside the chamber following door opening refer to a connection pressure of 2.0 bar. Decreasing supply pressure leads to longer recovery times. // ²⁾ Use this value for dimensioning air conditioning systems. /// All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a voltage fluctuation of ±10 %. The temperature data are determined in accordance with factory standard following DIN 12880 respecting the recommended wall clearances of 10 % of the height, width and depth of the inner chamber. All indications are average values, typical for units produced in series. We reserve the right to change technical specifications at any time.



► DIMENSIONS

C 150



► INSTALLATION REQUIREMENTS

	C 150
Wall clearance rear (mm/inch)	100 / 3.94
Wall clearance side (mm/inch)	50 / 1.97
Connection hose nozzle DN6 for CO ₂ for hose with internal diameter (mm/inch)	6 / 0.24
Nominal voltage (±10 %) 50/60 Hz (V)	230
Nominal power (kW)	1.4

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CO₂ incubator with additional process control

CB series | CB series with O₂ control

The CB series offers optimal growth conditions up to 60 °C combined with a highly effective 180 °C sterilization routine. A wide range of options such as O₂ control for hypoxic conditions, glass door or roller system are available for a variety of application-specific solutions. Our premium class incubator meets the highest demands on accuracy, safety and data communication.



► CB 150 model
with divided inner glass door option



Available sizes (liters)

► EQUIPMENT

- Temperature range from 7 °C above ambient temperature to 60 °C
- MCS controller for temperature and CO₂ concentration
 - User-friendly LCD screen
 - Easy-to-read menu guidance
 - Integrated electronic chart recorder
 - Variety of options for the graphic display of process parameters
 - Real-time clock
- Hot air sterilization at 180 °C (DIN 58947)
- VENTAIR™ air jacket system
- Drift-free infrared CO₂ measurement system
- Patented gas mixing nozzle
- Permadyr™ System; condensation-free double-pan humidification system, maintains dry interior walls
- Seamless deep-drawn inner chamber made of stainless steel with integrated shelf support system
- Electronic error self-diagnostic system with visual and audible alarms, as well as potential free contact for central monitoring
- Independent temperature safety device class 3.1 (DIN 12880) with visual and audible temperature alarm
- Tightly-fitted inner glass door
- RS 422 interface for APT-COM™ DataControlSystem communication software
- Three perforated shelves, stainless steel
- Door lock

► **CB SERIES | BEST GROWTH CONDITIONS:**



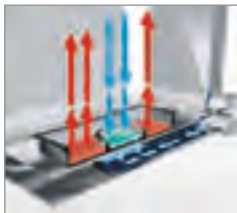
Uniform growth conditions

- VENTAIR™ air jacket system
 - Homogeneous temperature distribution at all levels
 - Extremely fast recovery times



Easy cleaning

- Seamless, deep-drawn inner chamber
 - High-quality stainless steel materials (1.4301)
 - No permanent fixtures
 - Removable water pan
 - Integrated shelf support system



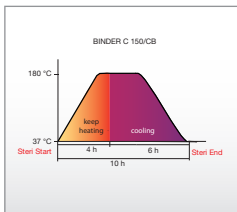
High humidity

- Permadyr™ double-pan humidification system
 - Saturated relative humidity up to 95 % r. H.
 - Rapid humidity recovery times
 - Optimal evaporation protection for cultures



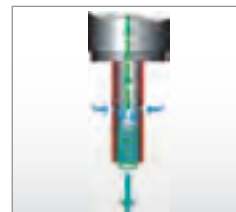
Stable pH values

- Infrared measurement system
 - Drift-free CO₂/O₂ sensor technology
 - Rapid response time
 - Precise measurement results



Reliable decontamination

- 180 °C hot-air sterilization
 - Complete elimination of contaminants
 - Automatic sterilization cycle
 - Globally recognized method



- Gas mixing head with Venturi effect
 - Homogeneous CO₂/O₂ distribution
 - Fast effective aeration

► **OPTIONS**

- Silicone access port with two silicone plugs
- Perforated shelf made of stainless steel
- Divided shelf made of stainless steel for gas-tight divided inner glass door
- Lockable controller keyboard
- Gas tank connection kit CO₂, O₂, N₂
- BINDER Gas Supply Service
- Unit conversion from RS 422 to Ethernet interface
- 4 – 20 mA analog outputs for temperature and CO₂ measurements
- Switched LEMO inner chamber socket
- Independent Intelligent Fail Safe monitoring function
- Calibration certificate for temperature and CO₂ or O₂
- Temperature measurement according to DIN 12880
- Current feedthrough (8-pin) for low voltage with LEMO socket
- Internal CO₂, O₂ or N₂ tank changer for connecting two gas tanks
- CELLROLL Set
- Stacking adapter:
 - Base on casters
 - Stable vibration-free stacking frame for two CO₂ incubators



Stacking adapter for thermal decoupled stacking of two CO₂ incubators (C and CB)



Gas Supply Service



CO₂ incubator with 9-compartment glass door

► **BINDER INDIVIDUAL**
More information on page 133

Technical data for your planning and installation

CB series | CB series with O₂ control

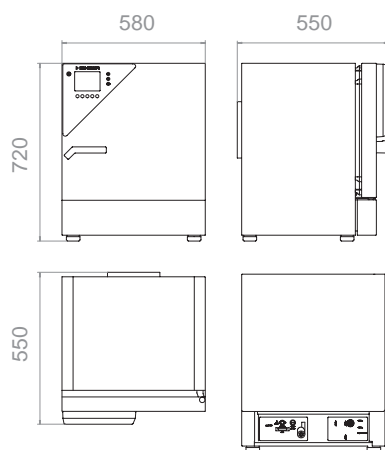


	CB 53	CB 150	CB 210
Exterior dimensions			
Width (mm/inch)	580 / 22.83	680 / 26.77	740 / 29.13
Height (including feet) (mm/inch)	720 / 28.35	920 / 36.22	1070 / 42.13
Depth (mm/inch)	550 / 21.65	715 / 28.15	715 / 28.15
Depth plus instrument triangle, door handle (mm/inch)	75 / 2.95	75 / 2.95	75 / 2.95
Interior dimensions			
Width (mm/inch)	400 / 15.75	500 / 19.69	560 / 22.05
Height (mm/inch)	400 / 15.75	600 / 23.62	750 / 29.53
Depth (mm/inch)	330 / 12.99	500 / 19.69	500 / 19.69
Interior volume (l/cu.ft.)	53 / 1.9	150 / 5.4	210 / 7.5
Perforated shelves (no. standard/max.)	2 / 3	3 / 6	3 / 8
Load per shelf (kg/lbs.)	10 / 22	10 / 22	10 / 22
Permitted total load (kg/lbs.)	30 / 66	30 / 66	30 / 66
Weight (empty) (kg/lbs.)	60 / 132	107 / 236	121 / 267
Temperature data			
Temperature range, above ambient (°C/°F)	5 – 60 / 9 – 140	7 – 60 / 12.6 – 140	7 – 60 / 12.6 – 140
Temperature uniformity at 37 °C / 98.6 °F (±K)	0.3	0.3	0.4
Temperature fluctuation at 37 °C / 98.6 °F (±K)	0.1	0.1	0.1
Recovery time after door was opened for 30 sec ¹⁾ at 37 °C / 98.6 °F (min)	3	3	3
CO₂ data			
CO ₂ range (Vol.-% CO ₂)	0 – 20	0 – 20	0 – 20
Setting accuracy (Vol.-% CO ₂)	0.1	0.1	0.1
Recovery time after door was opened for 30 sec ¹⁾ at 5 vol. % (min)	6	7	9
Humidity data			
Humidity average value (% r. H.)	95 ±2	95 ±2	95 ±2
Model no. standard equipment	9040-0069	9040-0038	9040-0039
O₂ data			
O ₂ range (vol.-% O ₂)	0.2 – 95	0.2 – 95	0.2 – 95
Setting accuracy (vol.-% O ₂)	0.1	0.1	0.1
Recovery time ¹⁾ after door was opened for 30 sec at 1 vol.-% O ₂ (min)	25	33	54
Recovery time ¹⁾ after door was opened for 30 sec at 5 vol.-% O ₂ (min)	9	10	11
Model no. with O₂ control	9040-0071	9040-0044	9040-0045

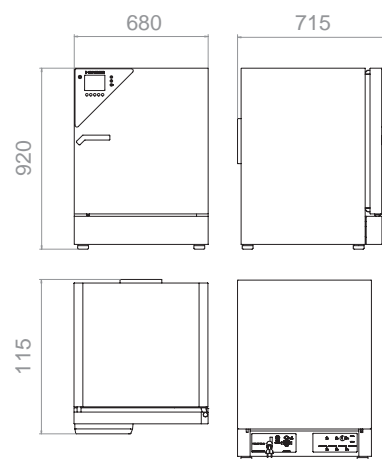
¹⁾ to 98 % of the set value. The recovery times of the gas concentrations inside the chamber following door opening refer to a connection pressure of 2.0 bar. Decreasing supply pressure leads to longer recovery times. // ²⁾ Use this value for dimensioning air conditioning systems. /// All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a voltage fluctuation of ±10 %. The temperature data are determined in accordance with factory standard following DIN 12880 respecting the recommended wall clearances of 10 % of the height, width and depth of the inner chamber. All indications are average values, typical for units produced in series. We reserve the right to change technical specifications at any time.

► DIMENSIONS

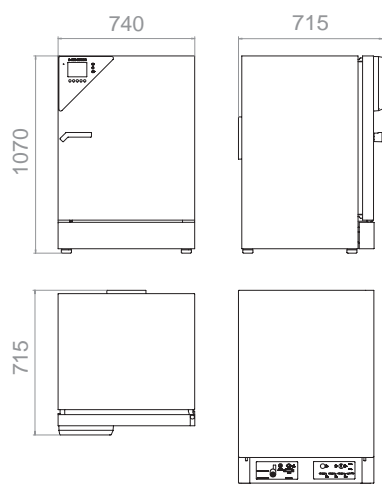
CB 53



CB 150



CB 210



► INSTALLATION REQUIREMENTS

	CB 53	CB 150	CB 210
Connection hose nozzle DN6 for CO ₂ for hose with internal diameter (mm/inch)	6 / 0.24	6 / 0.24	6 / 0.24
Connection hose nozzle DN6 for O ₂ /N ₂ for hose with internal diameter (mm/inch)	6 / 0.24	6 / 0.24	6 / 0.24
IP system of housing protection acc. to EN 60529	IP 20	IP 20	IP 20
Nominal voltage (±10 %) 50/60 Hz (V)	230	230	230
Nominal power (kW)	1	1.3	1.5
Energy consumption ²⁾ at 37 °C / 98.6 °F (Wh/h)	70	120	130
Wall clearance side (mm/inch)	50 / 1.97	50 / 1.97	50 / 1.97
Wall clearance rear (mm/inch)	100 / 3.94	100 / 3.94	100 / 3.94



37.05

BINDER

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Microbiology

BD | BF | KB series

Outstanding in detail: BINDER Microbiological incubators

- ▶ Outstanding precision
 - ▶ Reliably best culture conditions
 - ▶ High temperature uniformity thanks to APT.line™ preheating chamber
 - ▶ Tenths of a degree accuracy, precise temperature setting
 - ▶ Adjustable fan speed
- ▶ Outstandingly simple
 - ▶ Reliable decontamination concept
 - ▶ Disinfection routine at 100 °C
 - ▶ Inner chamber made of stainless steel with autoclavable fixtures
 - ▶ Inner glass door: “First look, then open”

When working with microorganisms, nothing is more crucial than precision incubation which remains stable in the long term. With the APT.line™ preheating chamber and the cooling system, we have developed two components that stand for unique precision – and results that are reproducible in each routine test. Whether for food microbiology or hygiene control, BINDER is your supplier of choice in the area of microbiological incubators. We offer a range of incubators that meet any application need.



Qualitative proof



Quantitative proof



In vitro tests

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Incubators with gravity convection

BD series

BD series incubators from BINDER with gravity convection are specially designed for long-term and stable continuous operation, ideal for gentle incubation of organisms, as well as conditioning of heat-sensitive media.



► BD 23 model



Available sizes (liters)

► EQUIPMENT

- Temperature range 5 °C above ambient temperature to 100 °C
- DS control with integrated timer 0 to 99 hrs
- Digital temperature setting with an accuracy of a tenth of a degree
- Independent temperature safety device class 3.1 (DIN 12880) with visual alarm
- Adjustable ventilation flap slide and rear exhaust Ø 50 mm
- Inner glass door
- RS 422 interface for APT-COM™ DataControlSystem communication software
- Units up to 115 liters are stackable
- Two chrome-plated racks included



► **BD SERIES | BEST CULTURE CONDITIONS:**



Reproducible growth conditions

- BINDER APT.line™ preheating chamber
 - Gentle temperature distribution with gravity convection
 - Homogeneous temperature at all levels



Minimal operating costs

- Energy saving
 - Hermetic door with 2-points door closure
 - Low heat dissipation due to 60 mm insulation
- Stable atmosphere
 - Inner glass door



Reliable decontamination

- Disinfection routine at 100 °C
 - Reduced risk of cross contamination
- Simple and fast cleaning
 - High-quality stainless steel inner chamber
 - No permanent fixtures

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► **OPTIONS**

- Access ports of various diameters with silicone plug
- Racks, chrome-plated or stainless steel
- Perforated shelf
- Door lock
- Switchable waterproof interior socket 230 V AC
- Switchable audio alarm for overheating
- Additional PT 100 temperature sensor
- Temperature measurement according to DIN 12880
- Calibration certificate
- Extension to factory calibration certificate (additional measuring point)
- Data Logger Kits and Logger Software

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Data Logger Kits



Additional PT 100 temperature sensor

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Access ports with silicone plug




BD 53 incubator with left-hinged door

► **BINDER
INDIVIDUAL**
More information
on page 133

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Technical data for your planning and installation

BD series

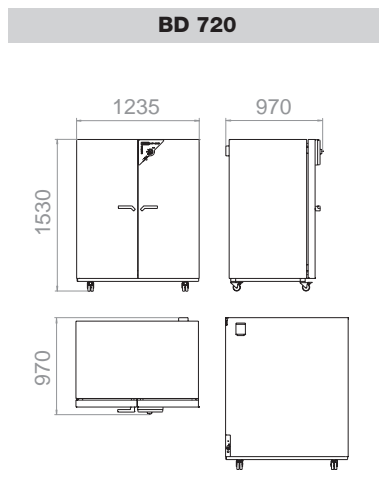
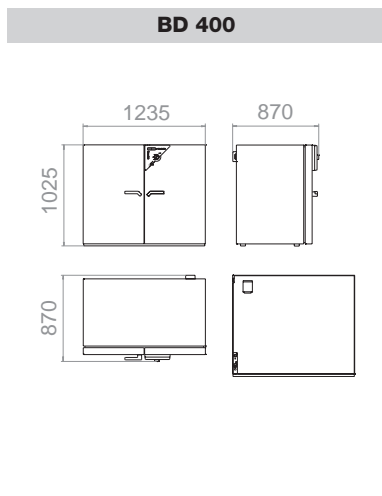
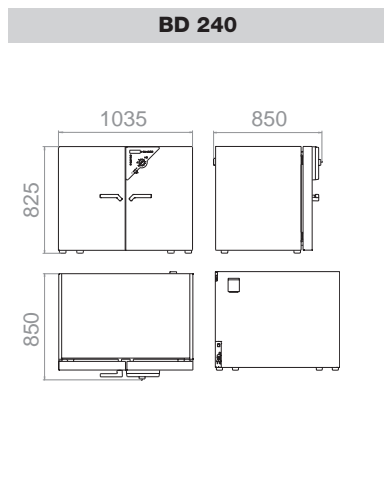
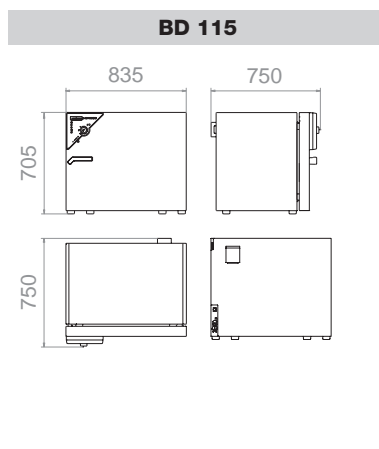
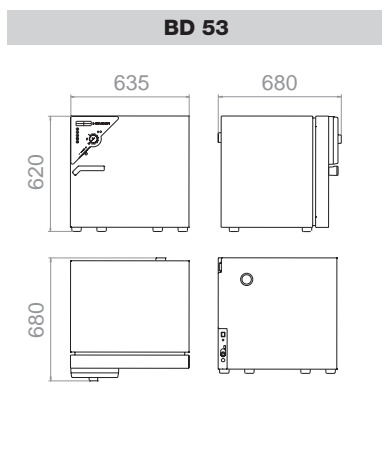
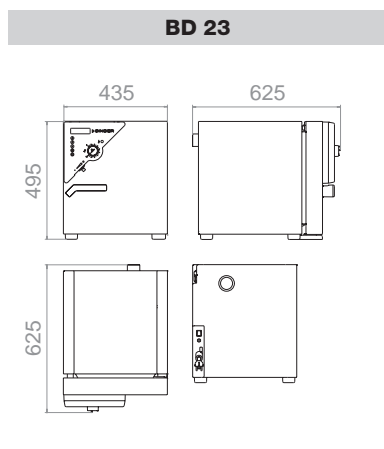


	BD 23	BD 53	BD 115	BD 240	BD 400	BD 720
Exterior dimensions						
Width (mm/inch)	435 / 17.13	635 / 25.0	835 / 32.87	1035 / 40.75	1235 / 48.62	1235 / 48.62
Height (including feet/casters) (mm/inch)	495 / 19.49	620 / 24.41	705 / 27.76	825 / 32.48	1025 / 40.35	1530 / 60.24
Depth (mm/inch)	520 / 20.47	575 / 22.64	645 / 25.39	745 / 29.33	765 / 30.12	865 / 34.06
plus door handle, I-panel and exhaust duct (mm/inch)	105 / 4.13	105 / 4.13	105 / 4.13	105 / 4.13	105 / 4.13	105 / 4.13
Quantity of doors	1	1	1	2	2	2
Interior dimensions						
Width (mm/inch)	222 / 8.74	400 / 15.75	600 / 23.62	800 / 31.50	1000 / 39.37	1000 / 39.37
Height (mm/inch)	330 / 12.99	400 / 15.75	480 / 18.90	600 / 23.62	800 / 31.50	1200 / 47.24
Depth (mm/inch)	277 / 10.91	330 / 12.99	400 / 15.75	500 / 19.69	500 / 19.69	600 / 23.62
Interior volume (l/cu.ft.)	20 / 0.7	53 / 1.9	115 / 4.1	240 / 8.6	400 / 14.3	720 / 25.7
Quantity of shelves (standard/max.)	2 / 3	2 / 4	2 / 5	2 / 7	2 / 10	2 / 15
Load per shelf (kg/lbs.)	12 / 26	15 / 33	20 / 44	30 / 66	35 / 77	45 / 99
Permitted total load (kg/lbs.)	25 / 55	40 / 88	50 / 110	70 / 155	90 / 199	120 / 265
Weight (empty) (kg/lbs.)	26 / 57	43 / 95	61 / 135	93 / 205	135 / 298	191 / 422
Temperature data						
Temperature range, 5 °C / 9 °F above ambient up to °C/°F	100 / 211.8	100 / 211.8	100 / 211.8	100 / 211.8	100 / 211.8	100 / 211.8
Temperature uniformity at 37 °C / 98.6 °F (±K)	0.5	0.5	0.4	0.5	0.5	0.5
Temperature fluctuation at 37 °C / 98.6 °F (±K)	0.2	0.1	0.1	0.1	0.1	0.1
Heating up time ¹⁾ to 37 °C / 98.6 °F (min)	49	38	62	70	105	84
Recovery time after door was opened 30 sec ¹⁾ at 37 °C / 98.6 °F (min)	3	5	5	5	6	4
Electrical data						
Housing protection acc. to EN 60529	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20
Nominal voltage (±10 %) 50/60 Hz (V)	230	230	230	230	230	230
Nominal power (kW)	0.2	0.4	0.4	0.68	0.85	1.25
Energy consumption at 37 °C / 98.6 °F (Wh/h)	11	11	20	33	56	80
Model no.						
	9010-0187	9010-0081	9010-0088	9010-0095	9010-0073	9010-0074

¹⁾ to 98 % of the set value /// All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a voltage fluctuation of ±10 %. The temperature data are determined in accordance with factory standard following DIN 12880 respecting the recommended wall clearances of 10 % of the height, width and depth of the inner chamber. All indications are average values, typical for units produced in series. We reserve the right to change technical specifications at any time.

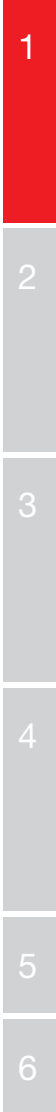


► DIMENSIONS



► INSTALLATION REQUIREMENTS

	BD 23	BD 53	BD 115	BD 240	BD 400	BD 720
Wall clearance rear (mm/inch)	100 / 3.94	100 / 3.94	100 / 3.94	100 / 3.94	100 / 3.94	100 / 3.94
Wall clearance side (mm/inch)	100 / 3.94	160 / 6.30	160 / 6.30	160 / 6.30	160 / 6.30	160 / 6.30
Nominal voltage (±10 %) 50/60 Hz (V)	230	230	230	230	230	230
Nominal power (kW)	0.2	0.4	0.4	0.68	0.85	1.25



Incubators with mechanical convection

BF series

The BF series is suitable for demanding incubation tasks, particularly for full loads and large batch throughputs. The incubator with mechanical convection provides optimal homogeneous conditions and has quick recovery times.



► BF 240 model



Available sizes (liters)

► EQUIPMENT

- Temperature range 5 °C above ambient temperature to 100 °C
- MS controller with several timer functions
- Timer functions: delayed ON, delayed OFF, temperature dependent delayed OFF
- Digital temperature setting with an accuracy of a tenth of a degree
- Adjustable fan speed
- Adjustable ventilation flap slide and rear exhaust Ø 50 mm
- Inner glass door
- Independent temperature safety device class 3.1 (DIN 12880) with visual alarm
- RS 422 interface for APT-COM™ DataControlSystem communication software
- Adjustable intervals for printer
- Units up to 115 liters are stackable
- Two chrome-plated racks



► **BF SERIES | BEST CULTURE CONDITIONS:**



Reproducible growth conditions

- BINDER APT.line™ preheating chamber
 - Homogeneous temperature conditions even under full load
 - Effective and gentle incubation
 - Rapid heating up and recovery times



Minimal operating costs

- Energy saving
 - Hermetic door with 2-points door closure
 - Low heat dissipation due to 60 mm insulation
- Stable atmosphere
 - Inner glass door



Reliable decontamination

- Disinfection routine at 100 °C
 - Reduced risk of cross contamination
- Simple and fast cleaning
 - High-quality stainless steel inner chamber
 - No permanent fixtures



Standard-compliant documentation

- FDA-compliant APT-COM™ software
- Years of proven and recognized validation and documentation materials
- Standard RS 422 interface for network connection

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► **OPTIONS**

- Access ports of various diameters with silicone plug
- Racks, chrome-plated or stainless steel
- Perforated shelf
- Door lock
- Switchable waterproof interior socket 230 V AC
- Switchable audio alarm for overheating
- Additional PT 100 temperature sensor
- Temperature measurement according to DIN 12880
- Calibration certificate
- Extension to calibration certificate
- Data Logger Kits and Logger Software



Data Logger Kits



Additional PT 100 temperature sensor



Calibration certificate



Incubator with keyboard lock

► **BINDER INDIVIDUAL**
More information on page 133

Technical data for your planning and installation

BF series



	BF 53	BF 115	BF 240	BF 400	BF 720
Exterior dimensions					
Width (mm/inch)	635 / 25.0	835 / 32.87	1035 / 40.75	1235 / 48.62	1235 / 48.62
Height (including feet/casters) (mm/inch)	620 / 24.41	705 / 27.76	825 / 32.48	1025 / 40.35	1530 / 60.24
Depth (mm/inch)	575 / 22.64	645 / 25.39	745 / 29.33	765 / 30.12	865 / 34.06
plus door handle and exhaust duct (mm/inch)	105 / 4.13	105 / 4.13	105 / 4.13	105 / 4.13	105 / 4.13
Quantity of doors	1	1	2	2	2
Interior dimensions					
Width (mm/inch)	400 / 15.75	600 / 23.62	800 / 31.50	1000 / 39.37	1000 / 39.37
Height (mm/inch)	400 / 15.75	480 / 18.90	600 / 23.62	800 / 31.50	1200 / 47.24
Depth (mm/inch)	330 / 12.99	400 / 15.75	500 / 19.69	500 / 19.69	600 / 23.62
Interior volume (l/cu.ft.)	53 / 1.9	115 / 4.1	240 / 8.6	400 / 14.3	720 / 25.7
Quantity of shelves (standard/max.)	2 / 5	2 / 5	2 / 7	2 / 10	2 / 15
Load per shelf (kg/lbs.)	15 / 33	20 / 44	30 / 66	35 / 77	45 / 99
Permitted total load (kg/lbs.)	40 / 88	50 / 110	70 / 155	90 / 199	120 / 265
Weight of the unit (empty) (kg/lbs.)	43 / 95	64 / 141	104 / 230	145 / 320	180 / 397
Temperature data					
Temperature range, 5 °C / 9 °F above ambient up to °C/°F	100 / 212	100 / 212	100 / 212	100 / 212	100 / 212
Temperature uniformity ¹⁾ at 37 °C / 98.6 °F (±K)	0.4	0.3	0.3	0.4	0.4
Temperature fluctuation at 37 °C / 98.6 °F (±K)	0.2	0.2	0.2	0.2	0.1
Heating-up time ²⁾ to 37 °C / 98.6 °F (min)	12	22	12	18	21
Recov. time after door was opened for 30 sec. ²⁾ at 37 °C / 98.6 °F (min)	1	1	1	2	1
Air change at 70 °C / 158 °F (x/h)	59	29	19	17	11
Electrical data					
Housing protection acc. to EN 60529	IP 20	IP 20	IP 20	IP 20	IP 20
Nominal voltage (±10 %) 50/60 Hz (V)	230	230	230	230	230
Nominal power (kW)	0.4	0.4	0.68	0.85	1.25
Energy consumption at 37 °C / 98.6 °F (Wh/h)	11	20	33	56	80
Model no.	9010-0235	9010-0237	9010-0239	9010-0241	9010-0243

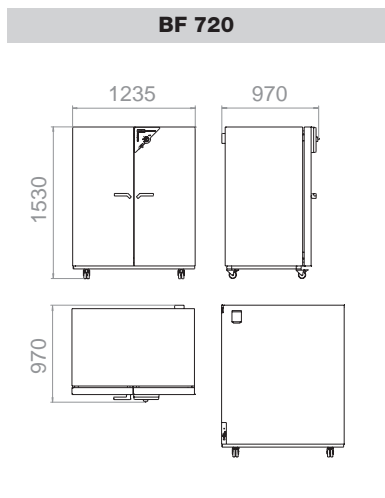
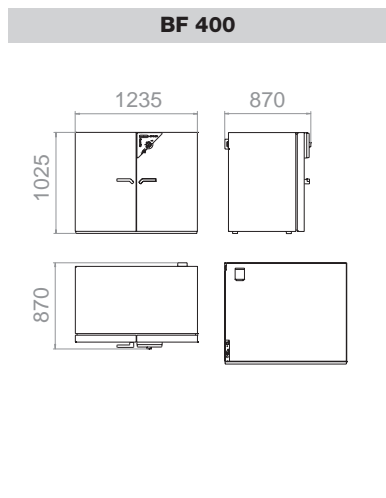
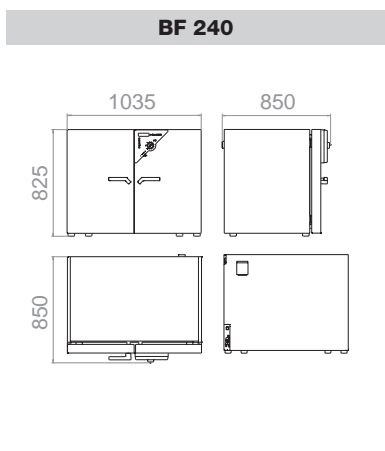
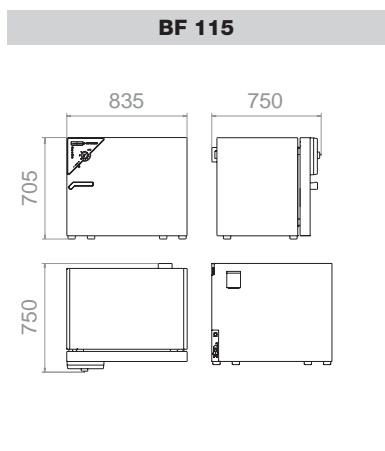
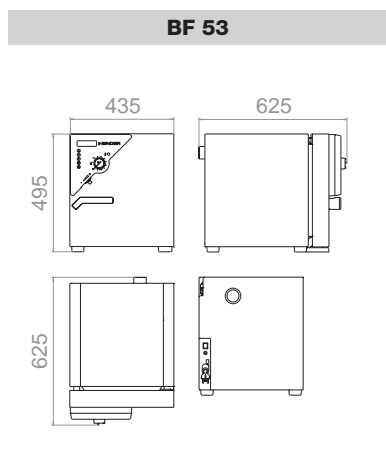
¹⁾ value without window // ²⁾ to 98 % of the set value /// All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a voltage fluctuation of ±10 %.

The temperature data are determined in accordance with factory standard following DIN 12880 respecting the recommended wall clearances of 10 % of the height, width and depth of the inner chamber.

All indications are average values, typical for units produced in series. We reserve the right to change technical specifications at any time.

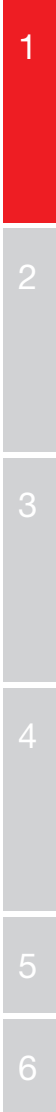


► DIMENSIONS



► INSTALLATION REQUIREMENTS

	BF 53	BF 115	BF 240	BF 400	BF 720
Wall clearance rear (mm/inch)	100 / 3.94	100 / 3.94	100 / 3.94	100 / 3.94	100 / 3.94
Wall clearance side (mm/inch)	160 / 6.30	160 / 6.30	160 / 6.30	160 / 6.30	160 / 6.30
Nominal voltage (±10 %) 50/60 Hz (V)	230	230	230	230	230
Nominal power (kW)	0.4	0.4	0.68	0.85	1.25



Refrigerated incubator with mechanical convection KB series

The BINDER refrigerated incubators are all-rounders for the incubation of microorganisms. The KB series controls a temperature range of -5 °C to 100 °C. With their comprehensive program functions, they offer a wide range of capabilities and deliver reproducible test results.



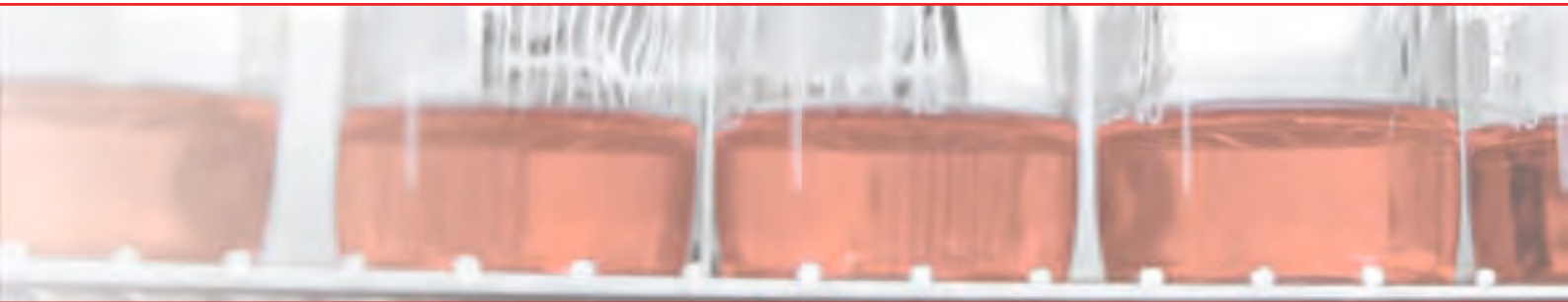
► KB 240 model



Available sizes (liters)

► EQUIPMENT

- Temperature range -5 °C to 100 °C
- MP controller with two programs with 10 sections each, alternatively switchable to one program with 20 sections
- Integrated weekly program timer with real-time function
- Adjustable ramp function via program editor
- Digital temperature setting with an accuracy of a tenth of a degree
- Adjustable fan speed
- Elapsed time indicator
- Independent temperature safety device class 3.1 (DIN 12880) with visual and audible alarm
- Inner glass door
- RS 422 interface for communication software APT-COM™ DataControlSystem
- Adjustable intervals for printer
- Units up to 115 liters are stackable
- Two shelves, stainless steel



► **KB SERIES | BEST CULTURE CONDITIONS:**



Wide range of programming options

- Multifunctional MP controller
 - 2 programs with 10 sections each
 - Weekly program function
 - Tenths of a degree accuracy, precise temperature setting
 - Standard RS 422 interface



Reliable decontamination

- Disinfection routine at 100 °C
 - Reduced risk of cross contamination
- Simple and fast cleaning
 - High-quality stainless steel inner chamber
 - No permanent fixtures



Reproducible incubation conditions

- APT.line™ preheating chamber
 - Homogeneous temperature conditions
 - Effective and gentle incubation
 - Rapid heating up and recovery times thanks to mechanical convection
- DCT™ cooling system
 - Minimum risk of evaporation
 - Incubation at 37 °C with integrated heat sources
 - Incubation even at high environmental conditions



Minimal operating costs

- Energy saving
 - Hermetic door with 2-points door latch
 - Low heat dissipation due to 60 mm insulation
- Stable atmosphere
 - Inner glass door

► **OPTIONS**

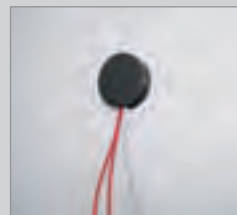
- Access ports of various diameters with silicone plug
- Racks, chrome-plated or stainless steel
- Perforated shelf
- Reinforced shelf with additional mounting
- Door lock
- Waterproof interior socket 230 V AC
- Switchable audio alarm for over temperature
- Additional PT 100 temperature sensor
- Analog output for temperature 4 – 20 mA with 6-pin DIN socket
- Zero-voltage relay outputs accessible via 6-pin DIN socket
- Temperature measurement according to DIN 12880
- Independent temperature safety device class 3.3 (DIN 12880)
- Calibration certificate and extension to calibration certificate
- Data Logger Kits and Logger Software



Data Logger Kits



Watertight inner chamber socket



Various access ports



Refrigerated incubator with full-view glass doors

► **BINDER
INDIVIDUAL**
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Technical data for your planning and installation

KB series

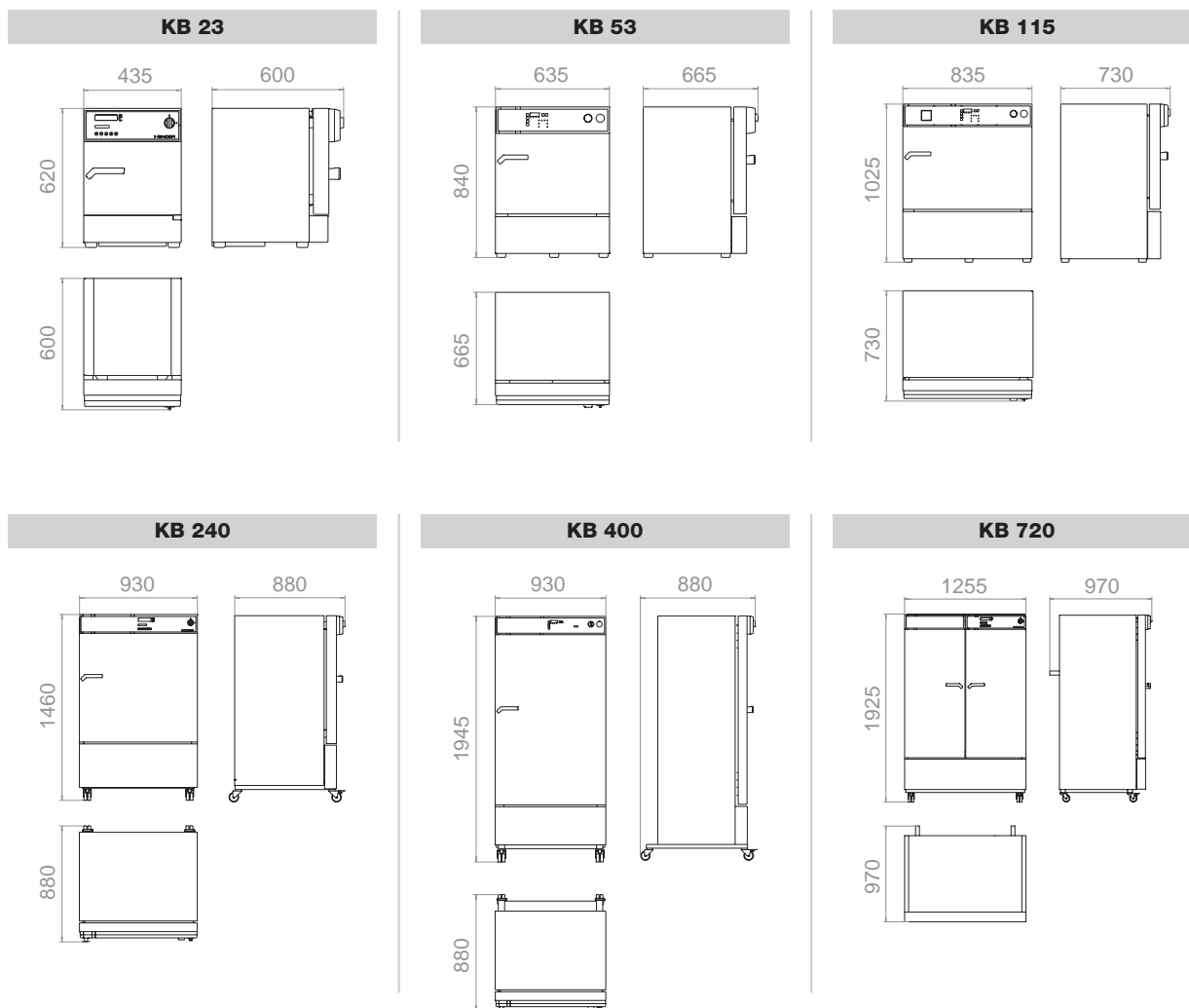


	KB 23	KB 53	KB 115	KB 240	KB 400	KB 720
Exterior dimensions						
Width (mm/inch)	435 / 17.13	635 / 25.0	835 / 32.87	930 / 36.61	930 / 36.61	1255 / 49.41
Height (incl. feet/castors) (mm/inch)	620 / 24.41	840 / 33.07	1025 / 40.35	1460 / 57.48	1945 / 76.57	1925 / 75.79
Depth including door handle, l-panel, connection, cable (mm/inch)	600 / 23.62	665 / 26.18	730 / 28.74	800 / 31.50	800 / 31.50	890 / 35.04
Quantity of doors	1	1	1	2	2	2
Interior dimensions						
Width (mm/inch)	222 / 8.74	400 / 15.75	600 / 23.62	650 / 25.59	650 / 25.59	970 / 38.19
Height (mm/inch)	330 / 12.99	400 / 15.75	480 / 18.90	785 / 30.91	1270 / 50.0	1250 / 49.21
Depth (mm/inch)	277 / 10.91	330 / 12.99	400 / 15.75	485 / 19.09	485 / 19.09	576 / 22.68
Interior volume (l/cu.ft.)	20 / 0.71	53 / 1.87	115 / 4.06	247 / 8.73	400 / 14.13	698 / 24.66
Quantity of racks (standard/max.)	2 / 3	2 / 4	2 / 5	2 / 9	2 / 15	2 / 15
Load per rack (kg/lbs.)	10 / 22	15 / 33	20 / 44	30 / 66	30 / 66	45 / 99
Permitted total load (kg/lbs.)	25 / 55	40 / 88	50 / 110	100 / 221	120 / 265	150 / 331
Weight (empty) (kg/lbs.)	44 / 97	72 / 159	105 / 232	170 / 375	220 / 486	309 / 682
Temperature data						
Temperature range (°C/°F) ¹⁾	0 – 100 / 32 – 212	-5 – 100 / 23 – 212	-5 – 100 / 23 – 212	-5 – 100 / 23 – 212	-5 – 100 / 23 – 212	-5 – 100 / 23 – 212
Temperature uniformity at 25 °C / 77 °F (±K)	0.3	0.2	0.1	0.2	0.2	0.2
Temperature fluctuation max. (±K)	0.2	0.1	0.1	0.1	0.1	0.1
Recovery time ²⁾ after door was open for 30 sec at 5 °C / 41 °F (min)	5	4	5	16	14	12
Electrical data						
Housing protection acc. to EN 60529	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20
Nominal voltage (±10 %) 50/60 Hz (V)	230 1N~	230 1N~	230 1N~	200 – 240 1N~	200 – 240 1N~	200 – 240 1N~
Nominal power (kW)	0.34	0.46	0.46	1.20	1.4	2.3
Energy consumption ³⁾ at 40 °C (Wh/h)	60	215	115	260	420	510
Model no.	9020-0112	9020-0114	9020-0116	9020-0162	9020-0178	9020-0111

¹⁾ Lower values are valid up to an ambient temperature of max. 25 °C / 77 °F // ²⁾ to 98 % of the set value // ³⁾ These energy consumption values can be used upon calculation of air conditioning systems. The useable interior height depends on the position of racks. /// All technical data is specified for units with standard equipment at an ambient temperature of 25 °C / 77 °F and a mains voltage fluctuation of ±10 %. The temperature data is determined in accordance with factory standard following DIN 12880, observing the recommended wall clearances of 10 % of the height, width, and depth of the inner chamber. Technical data refers to 100 % fan speed. All indications are average values, typical for units produced in series. We reserve the right to change technical specifications at any time.



► DIMENSIONS



► INSTALLATION REQUIREMENTS

	KB 23	KB 53	KB 115	KB 240	KB 400	KB 720
Wall clearance rear (mm/inch)	100 / 3.94	100 / 3.94	100 / 3.94	100 / 3.94	100 / 3.94	100 / 3.94
Wall clearance side (mm/inch)	100 / 3.94	160 / 6.30	160 / 6.30	100 / 3.94	100 / 3.94	100 / 3.94
Nominal voltage ($\pm 10\%$) 50/60 Hz (V)	230 1N~	230 1N~	230 1N~	200 – 240 1N~	200 – 240 1N~	200 – 240 1N~
Nominal power (kW)	0.34	0.46	0.46	1.2	1.4	2.3

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In vivo and In vitro cultures

KBW | KBWF series

Perfect conditions: BINDER Growth chambers

- ▶ Perfect climate
 - ▶ Responsive vapor pressure humidification ensure extremely low climatic gradients
 - ▶ Gentle air circulation provided by double-sided horizontal air flow
- ▶ Perfect light
 - ▶ Patented lighting system ensures homogeneous light distribution
 - ▶ Height-adjustable lighting system, three lamp types to choose from
- ▶ Perfect handling
 - ▶ Reliable decontamination concept
 - ▶ Easy-to-clean interior volume made of stainless steel 1.4301
 - ▶ Integrated weekly program in real-time

Homogeneous lighting conditions combined to constant temperature and humidity conditions are the outstanding features of the BINDER growth chambers. The APT.line™ preheating chamber and the responsive humidification system ensure powerful cooling and uniform light distribution for the best culture conditions. The KBW and KBWF series complements our comprehensive product portfolio and is a reliable partner for diverse applications.



In vitro cultures



In vivo cultures



Quality tests

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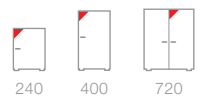
Growth chambers with illumination

KBW series

The BINDER KBW series growth chambers achieve homogeneous light distribution and ensure consistent temperature conditions with its natural illumination. Minimized response times guarantee that all test and growth parameters remain balanced. The weekly program timer integrated in the controller is a real plus in handling.



► KBW 240 model



Available sizes (liters)

► EQUIPMENT

- Temperature range 0 °C to 70 °C (without illumination)
- Temperature range 5 °C to 60 °C (with illumination)
- Variable positionable illumination cassettes, each with 5 daylight fluorescent illumination tubes
- MP controller with two programs with 10 sections each, alternatively switchable to one program with 20 sections
- Integrated weekly program timer with real-time function
- Digital temperature setting with an accuracy of a tenth of a degree
- Adjustable ramp function via program editor
- Adjustable fan speed
- Elapsed time indicator
- Access port Ø 30 mm, left side
- Inner glass door
- Independent temperature safety device class 3.1 (DIN 12880) with visual and audible alarm
- RS 422 interface for APT-COM™ DataControlSystem communication software
- Adjustable intervals for printer
- Two racks, stainless steel



► **KBW SERIES | BEST GROWTH CONDITIONS:**



Precise temperature conditions

- APT.line™ preheating chamber
 - Homogeneous temperature conditions
 - Constant and gentle air circulation
 - Small temperature gradients of ± 0.1 K
- DCT™ cooling system
 - Minimized risk of evaporation
 - Large capacity reserves for lighting applications



Wide range of programming options

- Multifunctional MP controller
- Two program with 10 sections each
 - Variable positionable illumination cassettes
 - Tenths of a degree accuracy, precise temperature setting
 - Standard RS 422 interface



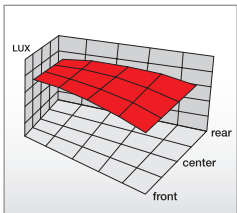
Homogeneous light distribution

- Flexible positioning of illumination cassettes
- Fully removable
- Three different light spectra, individually selectable



Comprehensive additional services

- Data Logger Kit
- Years of proven and recognized validation and documentation materials
- Customer-specific modifications



- Special reflector geometries guarantee a uniform illumination of the interior

► **OPTIONS**

- Access ports of various diameters with silicone plug
- Shelves, stainless steel
- Perforated shelf
- Reinforced rack with additional mounting
- Door lock
- FLUORA® growth fluorescent tube set
- Arabidopsis fluorescent tubes set
- Waterproof interior socket 230 V AC
- Ethernet interface
- Additional PT 100 temperature sensor
- Analog output for temperature 4 – 20 mA with 6-pin DIN socket
- Zero-voltage relay outputs accessible via 6-pin DIN socket
- Temperature measurement according to DIN 12880
- Independent temperature safety device class 3.3 (DIN 12880)
- Calibration certificate and extension to calibration certificate
- Data Logger Kits and Logger Software



FLUORA® or Arabidopsis illumination options



Data Logger Kits



Inner chamber socket



Growth chamber with viewing window

► **BINDER INDIVIDUAL**
More information on page 133

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Technical data for your planning and installation

KBW series

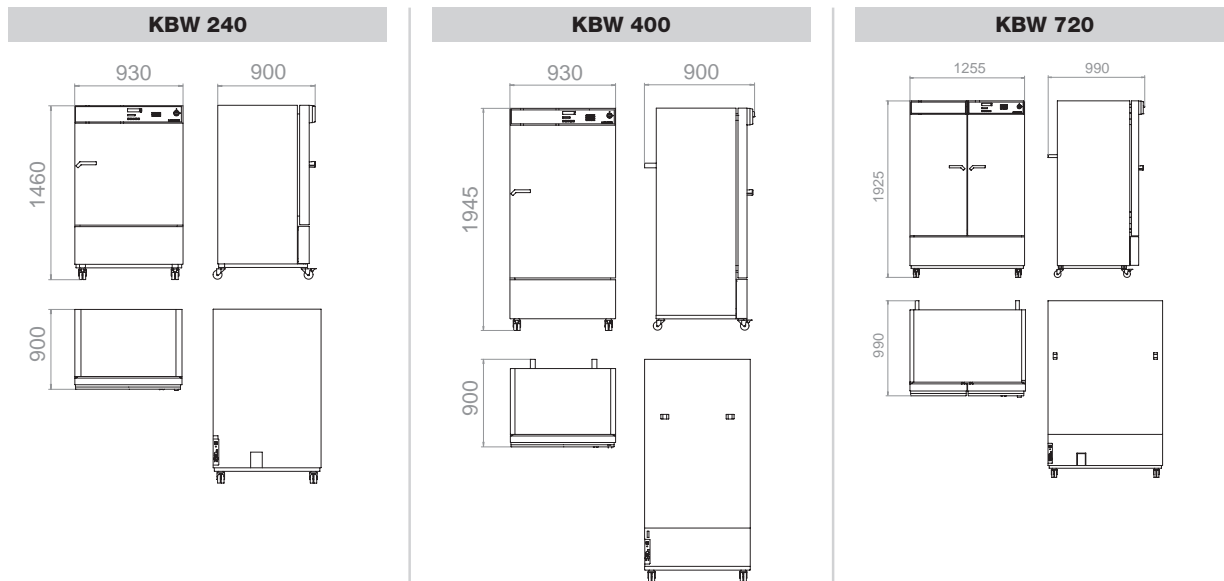


	KBW 240	KBW 400	KBW 720
Exterior dimensions			
Width (including access port) (mm/inch)	930 / 36.61	930 / 36.61	1255 / 49.41
Height (including castors) (mm/inch)	1460 / 57.48	1945 / 76.57	1925 / 75.79
Depth (mm/inch)	800 / 31.50	800 / 31.50	890 / 35.04
including door handle, l-panel, connection (mm/inch)	880 / 34.65	880 / 34.65	970 / 38.19
Quantity of doors	1	1	2
Interior dimensions			
Width (mm/inch)	650 / 25.59	650 / 25.59	970 / 38.19
Height (mm/inch)	785 / 30.91	1270 / 50.00	1250 / 49.21
Depth (mm/inch)	485 / 19.09	485 / 19.09	576 / 22.68
Interior volume (l/cu.ft.)	247 / 8.73	400 / 14.13	698 / 24.66
Quantity of racks (standard/max.)	2 / 9	3 / 12	3 / 12
Quantity of light cassettes (standard/max.)	2	3	3
Load per rack (kg/lbs.)	30 / 66	30 / 66	45 / 99
Permitted total load (kg/lbs.)	100 / 221	120 / 265	150 / 331
Weight (empty) (kg/lbs.)	202 / 446	267 / 589	377 / 832
Temperature data			
Temperature range ¹⁾ (°C/°F)	0 – 70 / 32 – 158	0 – 70 / 32 – 158	0 – 70 / 32 – 158
Temperature uniformity (±K)	0.5	0.5	0.5
Temperature fluctuation (±K)	0.1	0.1	0.1
Temperature data with 100 % light intensity			
Temperature range ¹⁾ (°C/°F)	5 – 60 / 41 – 140	5 – 60 / 41 – 140	5 – 60 / 41 – 140
Temperature uniformity (±K)	0.5	1.5	1.0
Temperature fluctuation (±K)	0.1	0.1	0.1
Electrical data			
Housing protection acc. to EN 60529	20	20	20
Nominal voltage (±10 %) 50/60 Hz (V)	200 – 240 1N~	200 – 240 1N~	200 – 240 1N~
Nominal power (kW)	1.4	1.6	2.7
Energy consumption with 100 % light intensity ²⁾ at 25 °C / 77 °F (Wh/h)	495	660	820
Model no.	9020-0164	9020-0180	9020-0172

¹⁾ Lower values are valid up to an ambient temperature of max. 25 °C / 77 °F // ²⁾ These values can be used upon calculation of air conditioning systems. // ³⁾ Average value, measured with a spherical sensor 12 cm / 4.7 in below the light cassette. The values given in W/m² refer to global radiation /// All technical data is specified for units with standard equipment at an ambient temperature of 25 °C / 77 °F and a mains voltage fluctuation of +/-10 %. The temperature data is determined in accordance with factory standard following DIN 12880, respecting the recommended wall clearances of 10 % of the height, width and depth of the inner chamber. Technical data refers to 100 % fan speed. All indications are average values, typical for units produced in series. We reserve the right to change technical specifications at any time.



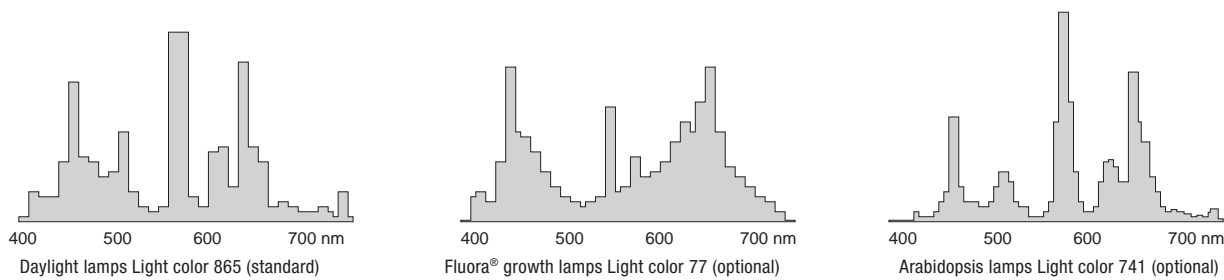
► DIMENSIONS



► INSTALLATION REQUIREMENTS

	KBW 240	KBW 400	KBW 720
Wall clearance rear (minimum) (spacers) (mm/inch)	100 / 3.94	100 / 3.94	100 / 3.94
Wall clearance side (minimum) (mm/inch)	100 / 3.94	100 / 3.94	100 / 3.94
Nominal voltage ($\pm 10\%$) 50/60 Hz (V)	200 – 240 1N~	200 – 240 1N~	200 – 240 1N~
Nominal power (kW)	1.4	1.6	2.7

► LIGHT SPECTRA



Illumination data per light cassette	KBW 240	KBW 400	KBW 720
Daylight tubes ³ (Lux / W/m ²)	10.000 / 36	10.000 / 31	14.200 / 38
Fluora® growth lamps ³ (Lux / W/m ²)	6.500 / 34	7.500 / 28	10.500 / 31
Arabidopsis lamps ³ (Lux / W/m ²)	10.000 / 40	11.000 / 35	14.400 / 38

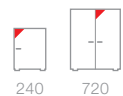


Growth chambers with illumination and humidity KBWF series

Through its versatile programming options, KBWF series achieves the perfect combination of temperature, humidity and light. The wide climate range enables any climate simulation precisely and consistently, over long periods of time, including programming for day/night cycles.



► KBWF 720 model



Available sizes (liters)

► EQUIPMENT

- Temperature range: 0 °C to 70 °C (without illumination and humidity)
- Temperature range: 10 °C to 60 °C (with illumination and humidity)
- Humidity range without illumination: 10 % to 80 % r. H.
- Humidity range with illumination: 10 % to 75 % r. H.
- Two variable positionable illumination cassettes, each with 5 daylight fluorescent illumination tubes
- MCS controller for temperature, humidity, and lighting control which can store 25 programs of 100 sections each, for a maximum of 500 program segments (for programming of day/night cycles)
 - Integrated electronic chart recorder
 - Variety of options for the graphic display of process parameters
 - Real-time clock
- Controlled humidification and dehumidification system with capacitive humidity sensor
- Independent temperature safety device class 3.1 (DIN 12880) with visual and audible temperature alarm
- Access port Ø 30 mm, left side
- Inner glass door
- Complete safety connection kit for water supply and drainage, including water hose, (total length 6 m)
- RS 422 interface for APT-COM™ DataControlSystem communication software
- Two racks, stainless steel



► **KBWF SERIES | BEST GROWTH CONDITIONS:**



Precise temperature conditions

- APT.line™ preheating chamber
 - Homogeneous temperature conditions
 - Constant and gentle air circulation
 - Small temperature gradients of $\pm 0.1K$
- DCT™ cooling system
 - Minimized risk of evaporation
 - Large capacity reserves for lighting applications



Individual program control

- MSC controller color screen
- Programmable day and night cycles
 - Variety of options for the graphic display of process parameters
 - Standard RS 422 interface



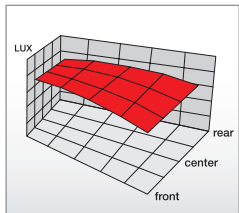
Homogeneous light distribution

- Flexible positioning of illumination cassettes
- Fully removable
- Three different light spectra, individually selectable



Comprehensive additional services

- Data Logger Kit
- Years of proven and recognized validation and documentation materials
- Customer-specific modifications



- Special reflector geometries guarantee a uniform illumination of the interior



Fast and precise humidification

- Vapor pressure humidification with fast response times
- Drift-free, capacitive humidity sensor
- Short recovery times after door opening
- Finely adjustable humidity control

► **OPTIONS**

- Access ports of various diameters with silicone plug
- Shelves, stainless steel
- Perforated shelf
- Reinforced rack with additional mounting
- Door lock
- FLUORA® growth fluorescent tube set
- Arabidopsis fluorescent tubes set
- Ethernet interface
- Additional PT 100 temperature sensor
- Analog output for temperature 4 – 20 mA with 6-pin DIN socket
- Zero-voltage relay outputs accessible via 6-pin DIN socket
- Lockable controller keyboard
- Ethernet interface
- External water supply set
- BINDER PURE AQUA SERVICE with single-use cartridge
- Measurement of temperature accuracy according to DIN 12880
- Calibration certificate and extension to calibration certificate
- Data Logger Kits and Logger Software



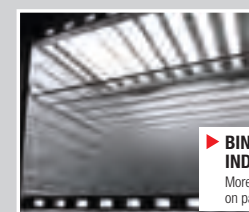
FLUORA® or Arabidopsis illumination options



BINDER PURE AQUA SERVICE



External water supply set



KBWF 720 with increased illumination

► **BINDER INDIVIDUAL**
More information on page 133

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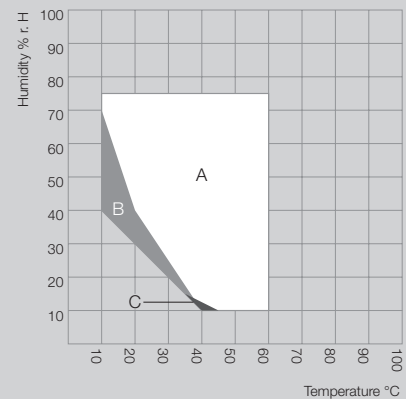
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Technical data for your planning and installation KBWF series

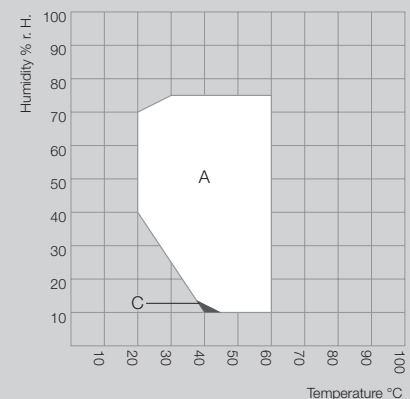


	KBWF 240	KBWF 720
Exterior dimensions		
Width (including access port) (mm/inch)	930 / 36.61	1225 / 49.41
Height (including castors) (mm/inch)	1460 / 57.48	1925 / 75.79
Depth (mm/inch)	800 / 31.50	890 / 35.04
Depth including door handle, l-triangle, connection, cable (mm/inch)	880 / 34.65	970 / 38.19
Number of doors	1	2
Interior dimensions		
Width (mm/inch)	650 / 25.59	973 / 38.31
Height (mm/inch)	785 / 30.91	1250 / 49.21
Depth (mm/inch)	485 / 19.09	576 / 22.68
Interior volume (l/cu.ft.)	247 / 8.73	700 / 24.73
Number of racks (standard/max.)	2 / 7	3 / 12
Number of light cassettes	2	3
Load per rack (kg/lbs.)	30 / 66	45 / 99
Permitted total load (kg/lbs.)	100 / 221	150 / 331
Weight (empty) (kg/lbs.)	214 / 472	374 / 826
Temperature data (without humidity)		
Temperature range without light cassettes ¹⁾ (°C/°F)	0 – 70 / 32 – 158	0 – 70 / 32 – 158
Temperature range with light cassettes, with illumination ¹⁾ (°C/°F)	10 – 60 / 50 – 140	10 – 60 / 50 – 140
Climatic data		
Temperature range without light cassettes ¹⁾ (°C/°F)	0 – 70 / 32 – 158	0 – 70 / 32 – 158
Temperature range with light cassettes, with illumination ¹⁾ (°C/°F)	10 – 60 / 50 – 140	20 – 60 / 68 – 140
Temperature uniformity with illumination (±K)	0.5 – 1.0	1.0 – 1.5
Temperature fluctuation with illumination (±K)	0.1 – 0.5	0.1 – 0.5
Humidity range without light cassettes (% r. H.)	10 – 80	10 – 80
Humidity range with light cassettes, with illumination ¹⁾ (°C/°F)	10 – 75	10 – 75
Humidity fluctuation with illumination (± % r. H.)	2	≤ 2.5
Electrical data		
Housing protection acc. to EN 60529	IP 20	IP 20
Nominal voltage (±10 %) 50/60 Hz (V)	200 – 240 1N~	200 – 240 1N~
Nominal power at 240 V (kW)	2.4	3.5
Energy consumption ³⁾ at 37 °C / 98.6 °F / 75 % r. H. (Wh/h)	600	2350
Model no.	9020-0166	9020-0173

► **TEMPERATURE-HUMIDITY CHART
KBWF 240 WITH LIGHT**



► **TEMPERATURE-HUMIDITY CHART
KBWF 720 WITH LIGHT**

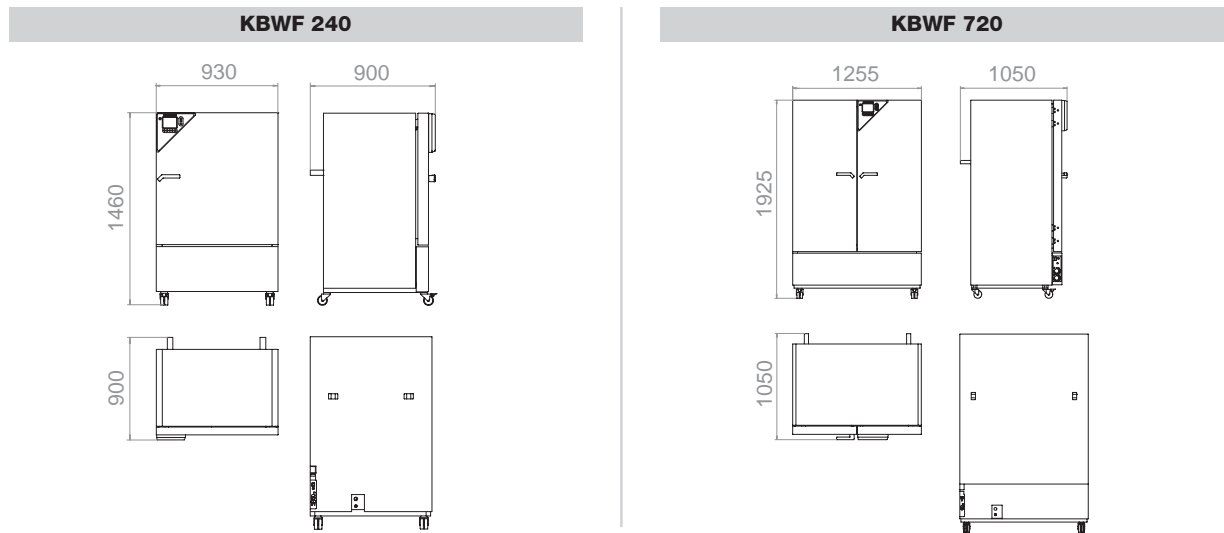


- A: Guaranteed condensation free range
- B: Temporary usable operation (up to 24 h)
- C: Deviations of technical data may be possible

¹⁾ Lower values are valid up to an ambient temperature of max. 25 °C / 77 °F // ²⁾ Average value, measured with a spherical sensor (±10 %) by 12 cm / 4.7 in below the light cassette. The values given in W/m² refer to global radiation. // ³⁾ Use this value for dimensioning air conditioning systems /// All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a voltage fluctuation of ±10 %. The temperature data are determined in accordance with BINDER factory standard following DIN 12880 respecting the recommended wall clearances of 10 % of the height, width and depth of the inner chamber. Technical data refers to 100 % fan speed. All indications are average values, typical for units produced in series. We reserve the right to change technical specifications at any time.



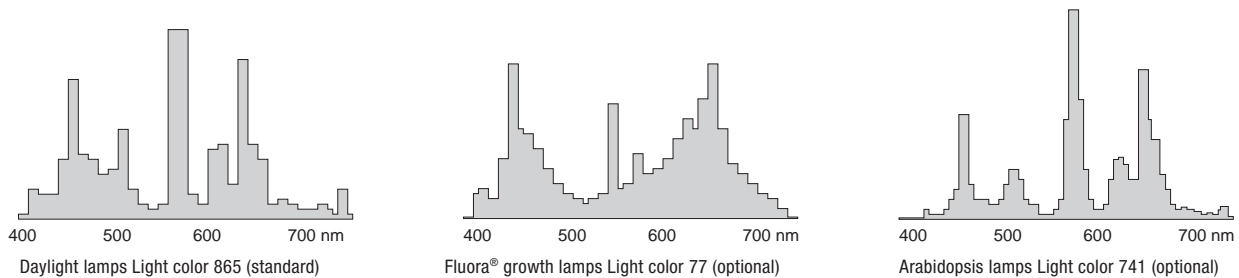
► DIMENSIONS



► INSTALLATION REQUIREMENTS

	KBWF 240	KBWF 720
Wall clearance rear (minimum) (spacer) (mm/inch)	100 / 3.94	100 / 3.94
Wall clearance side (minimum) (mm/inch)	100 / 3.94	200 / 7.87
Nominal voltage (±10 %) 50/60 Hz (V)	200 – 240 1N~	200 – 240 1N~
Nominal power at 240 V (kW)	2.4	3.5

► LIGHT SPECTRA



illumination data per light cassette	KBWF 240	KBWF 720
Daylight tubes ²⁾ (Lux / W/m ²)	10.000 / 36	14.200 / 38
Fluora® growth lamps ²⁾ (Lux / W/m ²)	6.500 / 34	10.500 / 31
Arabidopsis lamps ²⁾ (Lux / W/m ²)	10.000 / 40	14.400 / 38





Storage

| Always the right concept

An ultra low temperature freezer must reliably cool to maintain the value of the samples. This crucial laboratory requirement is supplemented by the necessity of a practical and user-oriented safety and control concept, e. g. by the effortless traceability of the temperature profile throughout the storage period or opening of the chamber easily.

BINDER rose to this challenge and developed a revolutionary ULT freezer that sets new security standards and fits seamlessly in BINDER's products range dedicated to the scientific laboratory.



Sample storage
UF V



Sample storage

UF V series

Ultra safe: BINDER Ultra low temperature freezer

- ▶ Ultra innovative
 - ▶ Personalized access control with RFID technology
 - ▶ Convenient RFID read-out of all door opening events
 - ▶ 24-hour exchange service in case of emergency
- ▶ Ultra simple
 - ▶ Door opens easily at the push of a button
 - ▶ Toolless filter change
 - ▶ Simple data read-out through a data logger with USB port
- ▶ Ultra efficient
 - ▶ Vacuum insulation panels
 - ▶ Optimal sample capacity for up to 52.800 samples

Safety without sacrificing reliability: true to this maxim, BINDER ultra low temperature freezers offer maximum process reliability and ease of use through innovative solutions. Our product includes everything you could wish for in sample storage: from reliable operation to user-friendly and system integration, to emergency exchange service.



Biological samples



Pharmaceutical agents



Blood banks

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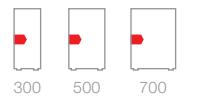
-86 °C Ultra low temperature freezers

UF V series

The new BINDER ultra low temperature freezers ensure safe long-term storage of samples at -86 °C. The UF V series is based on a multi-layer security concept, meeting any laboratory staff's needs beyond expectations.



► UF V 500 model



Available sizes (liters)

► EQUIPMENT

- Temperature range: -40 °C to -86 °C
- GUARD.CONTROL™ automatic door mechanism for easy opening and closing
- Personalized access control through RFID technology
- VIP.COMPOSITE™ internal large-surface vacuum insulation panels (VIP) on all 6 sides
- Two-stage cascade refrigeration with hermetically-sealed compressors
- Non-flammable refrigerant, CFC-free
- Heated duplex door gasket prevents icing
- User-friendly microprocessor controller with LED display
- Alarm test system
- Integrated visual and audible alarm system: in case of power failure, temperature alarm or battery failure
- Battery back-up system: Provides full functionality of alarms in case of power failure for 72 hours
- RS 422 interface
- Zero-voltage relay alarm output
- Analog output 4 – 20 mA
- Inner chamber made of high-quality stainless steel
- Robust, lockable casters
- Easy front access for air filter cleaning
- SERVICE.PRO™ 2-year warranty and 4-year extended warranty



► **UF V SERIES | MAXIMUM PROCESS SAFETY:**



- Safe and convenient operation**
GUARD.CONTROL™
- ▶ Personalized access control with RFID key card
 - ▶ Complete user log
 - ▶ Simple data read-out through RFID reader
 - ▶ Door mechanism for easy opening and closing at the push of a button



- Reliable back-up service**
SERVICE.PRO™
- ▶ 24-hour emergency exchange service (currently valid in G, F and GB)
 - ▶ 24/7 Hotline service after online registration
 - ▶ 2+4 (2 year warranty and 4-year extended warranty)



- Simple data management**
DATA.SECURE™
- ▶ Temperature recording via data logger with USB connection
 - ▶ Ease of integration into the security / alarm infrastructure
 - ▶ Integrated PT 100 for independent data recording



- Reliable refrigeration**
VIP.COMPLETE
- ▶ Large-surface insulation with Vacuum Insulation Panels
 - ▶ Maximum interior space utilization thanks to the narrow design (up to 52.800 samples)



- Easy maintenance and cleaning**
- ▶ Easy front access for air filter cleaning
 - ▶ Defrosting kit facilitates the de-icing process



► **OPTIONS**

- Access port 30 mm, rear panel
- Sample divider
- Cardboard cryo boxes, 50 mm, 75 mm without dividers
- Cardboard divider for cryo boxes, 49/64/81/100 cells
- Polypropylene cryo boxes, 50 mm / 75 mm with 81-cells and codification
- Various side access racks, for 50 and 75 mm boxes
- Various sliding drawer racks UF V, for 50 and 75 mm boxes
- CO₂ back-up system
- Ethernet interface
- Additional PT 100 sensor with LEMO socket
- Remote alarm GSM box
- Advanced voltage booster
- RFID reader
- PDF Data Logger with USB port
- Circular chart recorder
- Defrosting kit including de-icing tray, wiper and scraper
- Water cooling
- Deep temperature gloves
- Magnetic pouch



Temperature recording with PDF Data Logger via USB



Wide selection of racks and boxes



Defrosting kit (de-icing tray, wiper and scraper)



► **BINDER INDIVIDUAL**
 More information on page 133

Solutions customized to your requirements

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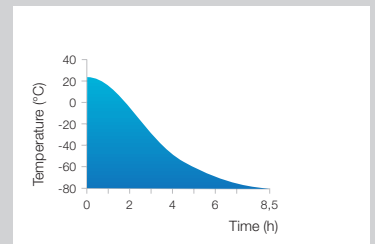
Technical data for your planning and installation

UF V series

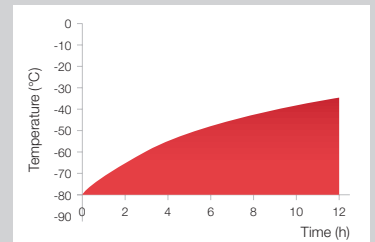


	UF V 300	UF V 500	UF V 700
Exterior dimensions			
Width (mm/inch)	755 / 29.72	900 / 35.43	1200 / 47.24
Height (mm/inch)	1970 / 77.56	1970 / 77.56	1970 / 77.56
Depth including controller, connection (mm/inch)	935 / 36.81	935 / 36.81	935 / 36.81
Wall clearance rear (mm/inch)	100 / 3.94	100 / 3.94	100 / 3.94
Wall clearance side (side without hinges) (mm/inch)	100 / 3.94	100 / 3.94	100 / 3.94
Wall clearance side (side with hinges) (mm/inch)	245 / 9.65	245 / 9.65	245 / 9.65
Interior dimensions			
Width of interior (mm/inch)	473 / 18.62	619 / 24.37	911 / 35.87
Width of shelf (mm/inch)	442 / 17.40	588 / 23.15	880 / 34.65
Height of interior (mm/inch)	1300 / 51.18	1300 / 51.18	1300 / 51.18
Depth of interior / Depth of shelf (mm/inch)	600 / 23.62	600 / 23.62	600 / 23.62
Interior volume, total (l/cu.ft.)	345 / 12.2	460 / 16.25	685 / 24.20
Number of shelves	3	3	3
Number of compartments / compartment doors	4 / 4	4 / 4	4 / 4
Permitted load per shelf (kg/lbs.)	40 / 88	50 / 110	65 / 143
Permitted total load (kg/lbs.)	160 / 353	200 / 442	260 / 574
Weight of the unit (empty) (kg/lbs.)	300 / 662	320 / 706	360 / 795
Temperature data			
Setting range °C/°F	-90-- -40/-130-- -40	-90-- -40/-130-- -40	-90-- -40/-130-- -40
Measuring range, ambient up to °C/°F	-90 / -130	-90 / -130	-90 / -130
Average temperature uniformity (±K)	2.5	2.5	2.5
Pull-down time from +25 °C / 77 °F to -80 °C / -112 °F ¹⁾ (hours)	9	9	9
Pull-up time in case of power failure from -80 °C / -122 °F to -60 °C / -76 °F (hours)	3	3	3
Electrical data UF V			
Housing protection acc. to EN 60529	20	20	20
Nominal voltage (+10 %) 50 Hz (V)	230	230	230
Energy consumption at -80 °C/ -112 °F with an ambient temperature of +25 °C / 77 °F (kWh/day)	12	13.9	16.2
Average heat dissipation at set-point -80 °C / -112 °F with an ambient temperature of +25 °C / 77 °F ²⁾ (W)	500	580	680
Model no. UFV with right hinged door	9020-0165	9020-0232	9020-0233
Model no. UFV with left hinged door	9020-0214	9020-0213	9020-0138

► COOLING DOWN TIME / DEFROST TIME AFTER POWER FAILURE



Cooling down time without loading at 25 °C ambient temperature



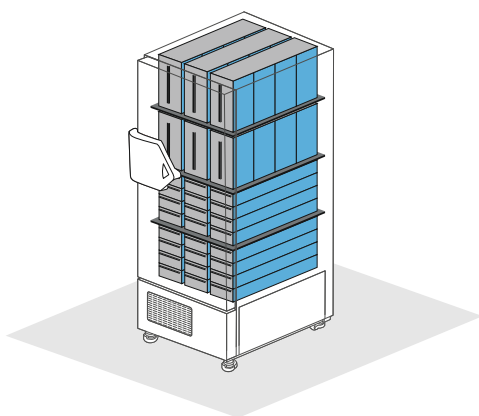
Defrost time without loading at 25 °C ambient temperature

¹⁾ to 98 % of the set value // ²⁾ Use this value for sizing air conditioning systems // ³⁾ pay attention to wall clearance /// All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a voltage fluctuation of ±10 %. The temperature data are determined in accordance with factory standard following DIN 12880 respecting the recommended wall clearances of 10 % of the height, width and depth of the inner chamber. All indications are average values, typical for units produced in series. We reserve the right to change technical specifications at any time.

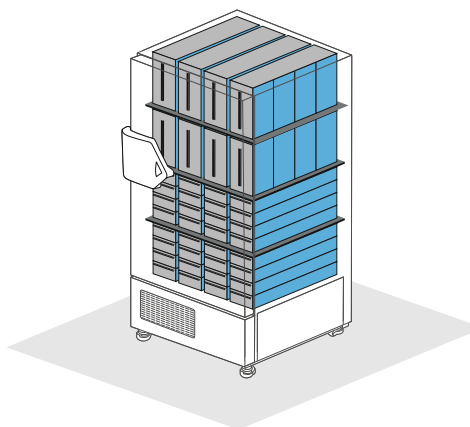


► LOADING VARIANTS (DRAWER RACKS AND BOXES)

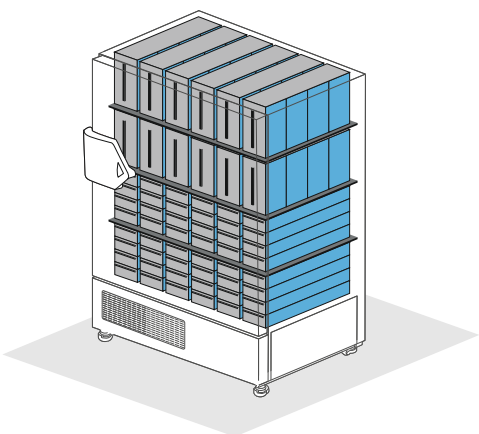
UF V 300



UF V 500



UF V 700



	UF V 300	UF V 500	UF V 700
Racks per compartment	3	4	6
Racks per chamber	12	16	24
Cryo boxes 50 mm (max. no.)	264	352	528
Cryo boxes 75 mm (max. no.)	168	224	336

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Drying and tempering


| Always the right temperature

Test chambers used in scientific laboratories, must achieve temperature stress testing requirements far beyond temperature accuracy, heat distribution and residue-free drying. This is the case with a chamber used to dry flammable materials that must meet safety standards.


BINDER masters these requirements like no other and offers you a wide range of drying and heating ovens, as well as material test chambers. Choose from ovens with gravity (natural) or mechanical (forced) convection for safety or vacuum drying. BINDER INDIVIDUAL meets your special requirements for these products as well.



Drying and Heat treatment
ED | FD | FED
Page 57



Material testing
FP | M
Page 71



Safety drying
FDL | MDL
Page 81



Vacuum drying
VD | VDL
Page 91



Drying and Heating ovens

ED | FD | FED series

Unsurpassed efficiency: BINDER Drying and Heating ovens

- ▶ Unsurpassed precision
 - ▶ Wide temperature range of 5 °C above ambient temperature to 300 °C
 - ▶ Fast, uniform tempering
 - ▶ Identical test conditions throughout the chamber interior
 - ▶ High standard according to DIN 12880 (27-point measurement)
- ▶ Unsurpassed reliability
 - ▶ Durable construction based on corrosion-resistant materials
 - ▶ Large capacity reserves
 - ▶ Short heating up and recovery times
 - ▶ Material temperature protection through an independent temperature safety device Class 2
- ▶ Unsurpassed versatility
 - ▶ Available with gravity (natural) and mechanical (forced) convection
 - ▶ Digital multifunctional controller with advanced timer functions
 - ▶ Communication interface
 - ▶ Adjustable front ventilation flap slide

Whether by gravity (natural) or mechanical (forced) convection, our drying and heating ovens provide high standards of quality and process stability. The wide temperature range of 5 °C above ambient temperature to 300 °C allows short heating up times and provide large capacity reserves. The excellent thermal insulation also reduces operating costs.



Glass drying



Sterilization



Plastics tempering

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Drying ovens with gravity convection

ED series

Routine drying and sterilization applications up to 300 °C and precision heat storage are the strength of ED drying ovens. Drying processes run much more efficiently with gravity (natural) convection and the high rate of air exchange.



► ED 53 model



Available sizes (liters)

► EQUIPMENT

- Temperature range from 5 °C above ambient temperature to 300 °C
- DS control with integrated timer 0 to 99 hrs
- Digital temperature setting with an accuracy of one degree
- Independent adjustable temperature safety device class 2 (DIN 12880), with visual temperature alarm
- Adjustable ventilation by means of front ventilation flap slide and rear exhaust Ø 50 mm
- Optional RS 422 Interface for APT-COM™ Data Control System communication software
- Units up to 115 liters are stackable
- Two chrome-plated racks included

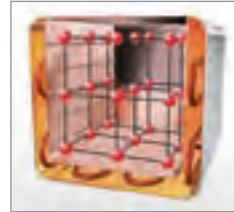


► ED SERIES | BEST DRYING RESULTS:



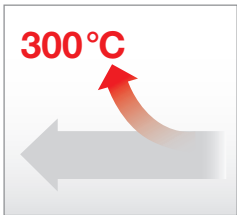
Uniform drying conditions

- APT.line™ preheating chamber
 - Homogeneous temperature control with gravity (natural) convection
 - Identical test conditions throughout the chamber interior independent of sample size and quantity



Best quality and precision guaranteed

- High standard according to DIN 12880 (27-point measurement according to factory standard)
- Short delivery times
- Minimal maintenance and operating costs



Broad range of applications

- Standard temperature range up to 300 °C
- Large capacity reserves
- Short heating up times



Convenient work environment

- Hermetic door closure with 2-points door closure
- Low heat dissipation due to 60 mm insulation
- Rack with tilt protection for easy loading and unloading
- Complete stainless steel inner chamber without permanent fixtures
- Easy cleaning

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► **OPTIONS**

- Access ports of various diameters with silicone plugs
- Racks, chrome-plated or stainless steel
- Perforated shelf, stainless steel
- Independent temperature safety device class 3.1 according to DIN 12880
- Door with window and interior lighting
- Door lock
- Door gasket made of FKM (Viton)
- Switchable audio alarm for overheating
- Analog output for temperature 4 – 20 mA with 6-pin DIN socket
- Temperature measurement according to DIN 12880
- Calibration certificate
- Extension to factory calibration certificate (additional measuring point)
- Data Logger Kits and Logger Software



Access ports with silicone plugs



Calibrations and validations



Door with window and interior lighting



► **BINDER INDIVIDUAL**
More information on page 133

Drying oven with special door access port for loading test materials

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Technical data for your planning and installation

ED series



	ED 23	ED 53	ED 115	ED 240	ED 400	ED 720
Exterior dimensions						
Width (mm/inch)	435 / 17.13	635 / 25.0	835 / 32.87	1035 / 40.75	1235 / 48.62	1235 / 48.62
Height (including feet/castors) (mm/inch)	495 / 19.49	620 / 24.41	705 / 27.76	825 / 32.48	1025 / 40.35	1530 / 60.24
Depth (mm/inch)	520 / 20.47	575 / 22.64	645 / 25.39	745 / 29.33	765 / 30.12	865 / 34.06
plus door handle, I-panel and exhaust duct (mm/inch)	105 / 4.13	105 / 4.13	105 / 4.13	105 / 4.13	105 / 4.13	105 / 4.13
Quantity of doors	1	1	1	2	2	2
Interior dimensions						
Width (mm/inch)	222 / 8.74	400 / 15.75	600 / 23.62	800 / 31.50	1000 / 39.37	1000 / 39.37
Height (mm/inch)	330 / 12.99	400 / 15.75	480 / 18.90	600 / 23.62	800 / 31.50	1200 / 47.24
Depth (mm/inch)	300 / 11.81	350 / 13.78	420 / 16.54	520 / 20.47	520 / 20.47	620 / 24.41
Interior volume (l/cu.ft.)	20 / 0.7	53 / 1.9	115 / 4.1	240 / 8.6	400 / 14.3	720 / 25.7
Quantity of racks (standard/max.)	2 / 3	2 / 5	2 / 6	2 / 7	2 / 10	2 / 15
Load per rack (kg/lbs.)	12 / 26	15 / 33	20 / 44	30 / 66	35 / 77	45 / 99
Permitted total load (kg/lbs.)	25 / 55	40 / 88	50 / 110	70 / 155	90 / 199	120 / 265
Weight of the unit (empty) (kg/lbs.)	22 / 49	42 / 93	57 / 126	86 / 190	125 / 276	174 / 384
Temperature data						
Temperature range, by 5 °C/9 °F above ambient up to °C/°F	300 / 572	300 / 572	300 / 572	300 / 572	300 / 572	300 / 572
Temperature uniformity ¹⁾ at 150 °C/302 °F (±K)	2.5	3.2	2.5	2.5	3	2.8
Temperature fluctuation at 70 °C/158 °F (±K)	0.3	0.3	0.3	0.3	0.3	0.3
Heating-up time ²⁾ to 150 °C/302 °F (min)	24	27	29	48	62	69
Recov. time after door was opened for 30 sec. ³⁾ at 150 °C/302 °F (min)	5	6	9	13	20	14
Air change at 150 °C/302 °F (x/h)	13	19	10	10	10	9
Electrical data						
Housing protection acc. to EN 60529	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20
Nominal voltage (±10 %) 50/60 Hz (V)	230 1 N ~	230 1 N ~	230 1 N ~	230 1 N ~	400 3 N ~	400 3 N ~
Nominal power (kW)	0.8	1.2	1.6	2.7	3.4	5.0
Energy consumption at 150 °C/302 °F (Wh/h)	148	210	300	447	672	750
Model no. without RS 422	9010-0190	9010-0078	9010-0096	-	-	-
Model no. with RS 422	9010-0191	9010-0079	9010-0097	9010-0101	9010-0075	9010-0076

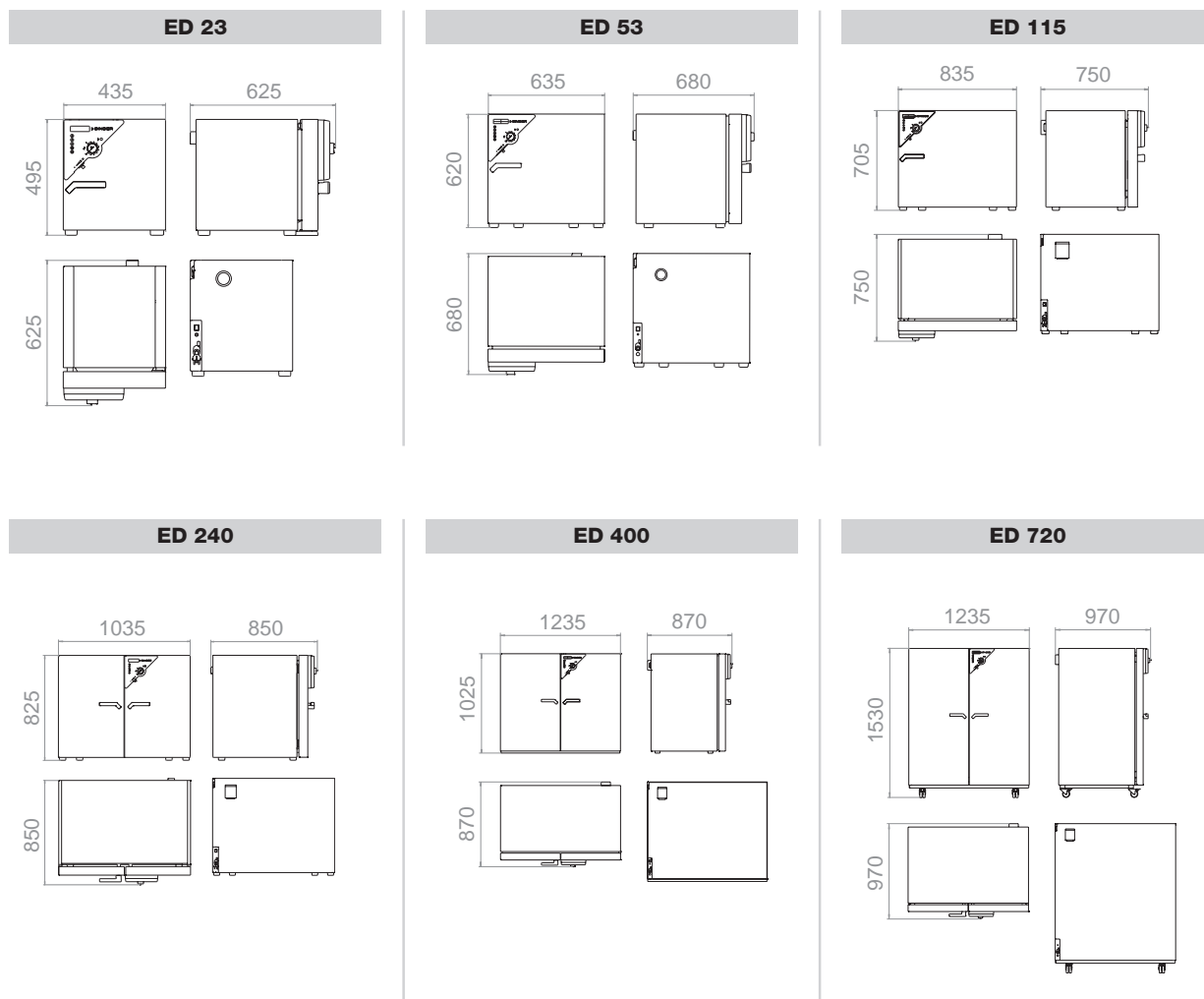
¹⁾ value without window // ²⁾ to 98 % of the set value /// All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a voltage fluctuation of ±10 %.

The temperature data are determined in accordance with factory standard following DIN 12880 respecting the recommended wall clearances of 10 % of the height, width and depth of the inner chamber.

All indications are average values, typical for units produced in series. We reserve the right to change technical specifications at any time.



► DIMENSIONS



► INSTALLATION REQUIREMENTS

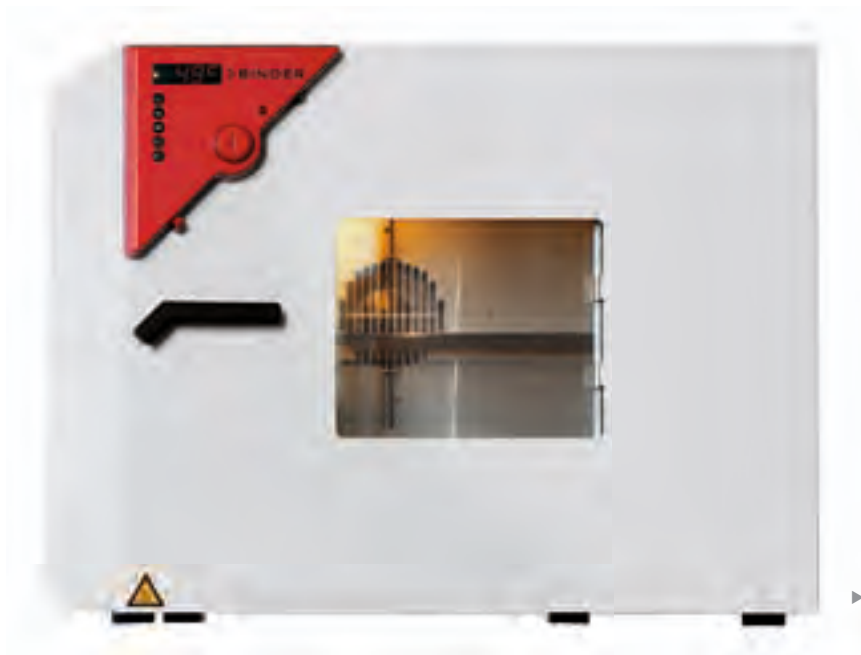
	ED 23	ED 53	ED 115	ED 240	ED 400	ED 720
Nominal voltage ($\pm 10\%$) 50/60 Hz (V)	230 1 N ~	230 1 N ~	230 1 N ~	230 1 N ~	400 3 N ~	400 3 N ~
Nominal power (kW)	0.8	1.2	1.6	2.7	3.4	5

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Drying ovens with mechanical convection

FD series

The FD series is the optimal choice when fast drying and sterilization are required. With fully homogeneous temperature distribution, quick dynamics and powerful fan, the FD saves valuable time.



► FD 115 model
with option window



► EQUIPMENT

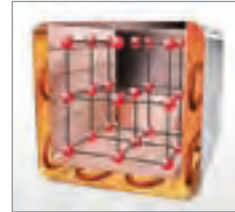
- Temperature range from 5 °C above ambient temperature to 300 °C
- DS control with integrated timer 0 to 99 hrs
- Digital temperature setting with an accuracy of one degree
- Independent adjustable temperature safety device class 2 (DIN 12880), with visual temperature alarm
- Adjustable ventilation by means of front ventilation flap slide and rear exhaust Ø 50 mm
- Units up to 115 liters are stackable
- Two chrome-plated racks included

► **FD SERIES | BEST DRYING RESULTS:**



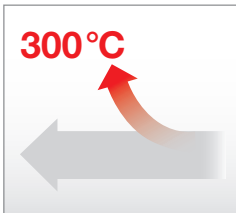
Uniform drying conditions

- APT.line™ preheating chamber
- Homogeneous temperature control with mechanical (forced) convection
- Identical test conditions throughout the chamber interior independent of sample size and quantity



Best quality and precision guaranteed

- High standard according to DIN 12880 (27-point measurement)
- Short delivery times
- Minimal maintenance and operating costs



Broad range of applications

- Standard temperature range up to 300 °C
- Large capacity reserves
- Short heating up times



Convenient work environment

- User-friendly microprocessor control
- Hermetic door closure with 2-points door closure
- Low heat dissipation due to 60 mm insulation
- Rack with tilt protection for easy loading and unloading
- Complete stainless steel inner chamber without permanent fixtures
- Easy cleaning

► **OPTIONS**

- Access ports of various diameters with silicone plugs
- Racks, chrome-plated or stainless steel
- Perforated shelf, stainless steel
- Independent temperature safety device class 3.1 according to DIN 12880
- Door with window and interior lighting
- Door lock
- Door gasket made of FKM (Viton)
- Switchable audio alarm for overheating
- Analog output for temperature 4 – 20 mA with 6-pin DIN socket
- Temperature measurement according to DIN 12880
- Calibration certificate
- Extension to factory calibration certificate (additional measuring point)
- Data Logger Kits and Logger Software



Access ports with silicone plugs



Reinforced shelves



Door with window and interior lighting



Drying oven with partitioned inner chamber and suspensions

► **BINDER
INDIVIDUAL**
More information
on page 133

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Technical data for your planning and installation

FD series



	FD 23	FD 53	FD 115	FD 240
Exterior dimensions				
Width (mm/inch)	435 / 17.13	635 / 25.0	835 / 32.87	1035 / 40.75
Height (including feet/castors) (mm/inch)	495 / 19.49	620 / 24.41	705 / 27.76	825 / 32.48
Depth (mm/inch)	520 / 20.47	575 / 22.64	645 / 25.39	745 / 29.33
plus door handle, I-panel and exhaust duct (mm/inch)	105 / 4.13	105 / 4.13	105 / 4.13	105 / 4.13
Quantity of doors	1	1	1	2
Interior dimensions				
Width (mm/inch)	222 / 8.74	400 / 15.75	600 / 23.62	800 / 31.50
Height (mm/inch)	330 / 12.99	400 / 15.75	480 / 18.90	600 / 23.62
Depth (mm/inch)	300 / 11.81	340 / 13.39	410 / 16.14	510 / 20.08
Interior volume (l/cu.ft.)	20 / 0.7	53 / 1.9	115 / 4.1	240 / 8.6
Quantity of racks (standard/max.)	2 / 3	2 / 5	2 / 6	2 / 7
Load per rack (kg/lbs.)	12 / 26	15 / 33	20 / 44	30 / 66
Permitted total load (kg/lbs.)	25 / 55	40 / 88	50 / 110	70 / 155
Weight of the unit (empty) (kg/lbs.)	33 / 73	44 / 97	62 / 137	96 / 212
Temperature data				
Temperature range, 5 °C/9 °F above ambient up to °C/°F	300 / 572	300 / 572	300 / 572	300 / 572
Temperature uniformity ¹⁾ at 150 °C/302 °F (±K)	2.2	2	1.8	2.0
Temperature fluctuation (<= ±K)	0.3	0.3	0.3	0.3
Heating-up time ²⁾ to 150 °C/302 °F (min)	22	24	28	24
Recov. time after door was opened for 30 sec. ^{1) 2)} at 150 °C/302 °F (min)	4	5	5	6
Air change at 150 °C/302 °F (x/h)	64	64	32	20
Electrical data				
Housing protection acc. to EN 60529	IP 20	IP 20	IP 20	IP 20
Nominal voltage (±10 %) 50/60 Hz (V)	230 1 N ~	230 1 N ~	230 1 N ~	230 1 N ~
Nominal power (kW)	0.8	1.2	1.6	2.7
Energy consumption at 150 °C/302 °F (Wh/h)	300	429	544	850
Model no.				
	9010-0194	9010-0082	9010-0102	9010-0104

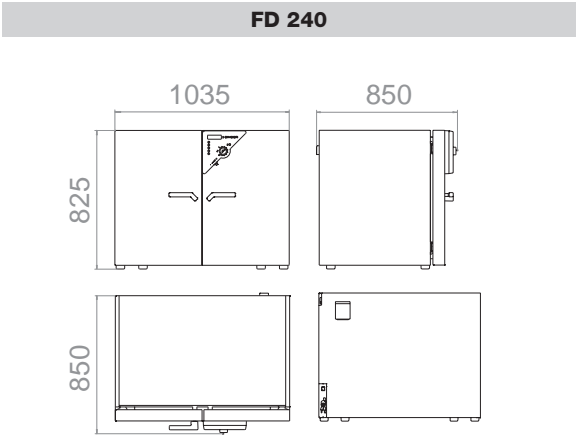
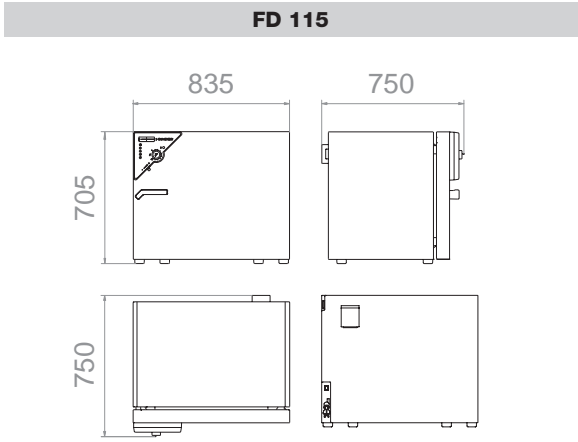
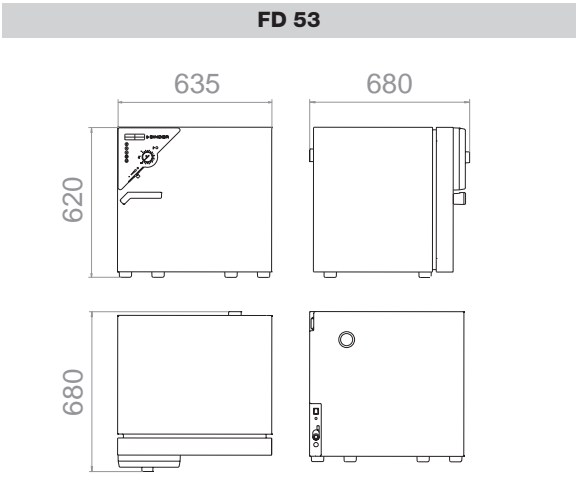
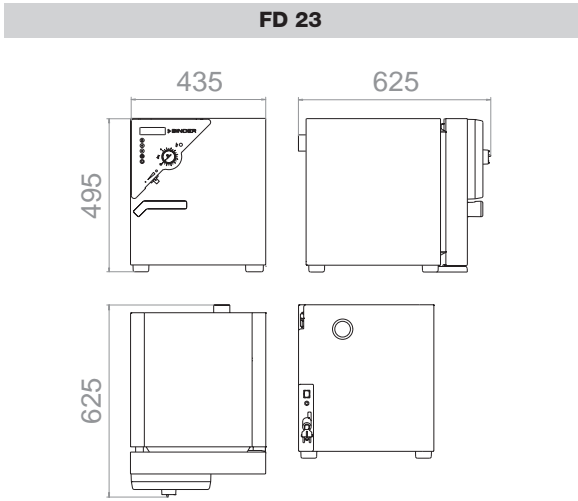
¹⁾ value without window // ²⁾ to 98 % of the set value /// All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a voltage fluctuation of ±10 %.

The temperature data are determined in accordance with factory standard following DIN 12880 respecting the recommended wall clearances of 10 % of the height, width and depth of the inner chamber.

All indications are average values, typical for units produced in series. We reserve the right to change technical specifications at any time.



► DIMENSIONS



► INSTALLATION REQUIREMENTS

	FD 23	FD 53	FD 115	FD 240
Nominal voltage (±10 %) 50/60 Hz (V)	230 1 N ~	230 1 N ~	230 1 N ~	230 1 N ~
Nominal power (kW)	0.8	1.2	1.6	2.7

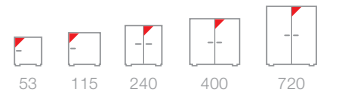
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Heating chambers with mechanical convection FED series

Our multi-talented series: almost unlimited capacity and particularly adaptable to the individual requirements of many different tests. With advanced timing functions and a digitally controllable fan, temperature and convection conditions are easily controlled.



► FED 240 model



Available sizes (liters)

► EQUIPMENT

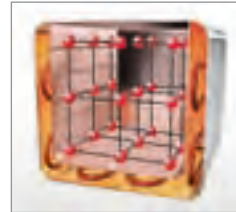
- Temperature range from 5 °C above ambient temperature to 300 °C
- MS controller with several timer functions
- Controller timer functions: delayed ON, delayed OFF, temperature dependent delayed OFF
- Digital temperature setting with an accuracy of one degree
- Adjustable fan speed
- Adjustable ventilation by means of front ventilation flap slide and rear exhaust Ø 50 mm
- Independent adjustable temperature safety device class 2 (DIN 12880), with visual temperature alarm
- RS 422 interface for APT-COM™ DataControlSystem communication software
- Units up to 115 liters are stackable
- Two chrome-plated racks included

► **FED SERIES | BEST DRYING RESULTS:**



Uniform drying conditions

- APT.line™ preheating chamber
 - Homogeneous temperature control with mechanical (forced) convection
 - Identical test conditions throughout the chamber interior independent of sample size and quantity



Best quality and precision guaranteed

- High standard according to DIN 12880 (27-point measurement)
- Short delivery times
- Minimal maintenance and operating costs



User-friendly controller

- Digital multifunctional controller (MS)
 - Advanced timing functions
 - In the user's field of vision
 - Easy to operate



Convenient work environment

- User-friendly microprocessor control
- Hermetic door closure with 2-points door closure
- Low heat dissipation due to 60 mm insulation
- Rack with tilt protection for easy loading and unloading
- Complete stainless steel inner chamber without permanent fixtures
- Easy cleaning

► **OPTIONS**

- Access ports of various diameters with silicone plugs
- Racks, chrome-plated or stainless steel
- Perforated shelf, stainless steel
- Independent temperature safety device class 3.1 according to DIN 12880
- Door with window and interior lighting
- Door lock
- Door gasket made of FKM (Viton)
- Switchable audio alarm for overheating
- Analog output for temperature 4 – 20 mA with 6-pin DIN socket
- Temperature measurement according to DIN 12880
- Calibration certificate
- Extension to factory calibration certificate (additional measuring point)
- Data Logger Kits and Logger Software



Data Logger Kits



Reinforced shelves



Door with window and interior lighting



Heating chamber with special extension for loading without opening the door

► **BINDER
INDIVIDUAL**
More information
on page 133

Technical data for your planning and installation

FED series



	FED 53	FED 115	FED 240	FED 400	FED 720
Exterior dimensions					
Width (mm/inch)	635 / 25.0	835 / 32.87	1035 / 40.75	1235 / 48.62	1235 / 48.62
Height (including feet/castors) (mm/inch)	620 / 24.41	705 / 27.76	825 / 32.48	1025 / 40.35	1530 / 60.24
Depth (mm/inch)	575 / 22.64	645 / 25.39	745 / 29.33	765 / 30.12	865 / 34.06
plus door handle, I-panel, exhaust duct (mm/inch)	105 / 4.13	105 / 4.13	105 / 4.13	105 / 4.13	105 / 4.13
Number of doors	1	1	2	2	2
Interior dimensions					
Width (mm/inch)	400 / 15.75	600 / 23.62	800 / 31.50	1000 / 39.37	1000 / 39.37
Height (mm/inch)	400 / 15.75	480 / 18.90	600 / 23.62	800 / 31.50	1200 / 47.24
Depth (mm/inch)	340 / 13.39	410 / 16.14	510 / 20.08	510 / 20.08	610 / 24.02
Interior volume (l/cu.ft.)	53 / 1.9	115 / 4.1	240 / 8.6	400 / 14.3	720 / 25.7
Number of racks (standard/max.)	2 / 5	2 / 6	2 / 7	2 / 10	2 / 15
Load per rack (kg/lbs.)	15 / 33	20 / 44	30 / 66	35 / 77	45 / 99
Permitted total load (kg/lbs.)	40 / 88	50 / 110	70 / 155	90 / 199	120 / 265
Weight of the unit (empty) (kg/lbs.)	44 / 97	62 / 137	96 / 212	145 / 320	195 / 430
Temperature data					
Temperature range, 5 °C/9 °F above ambient up to °C/°F	300 / 572	300 / 572	300 / 572	300 / 572	300 / 572
Temperature uniformity ¹⁾ at 150 °C/302 °F (±K)	2	1.8	2	2.5	2.0
Temperature fluctuation at 150 °C/302 °F (±K)	0.3	0.3	0.3	0.3	0.3
Heating-up time ²⁾ to 150 °C/302 °F (min)	24	30	27	35	39
Recov. time after door was opened for 30 sec. ³⁾ at 150 °C/302 °F (min)	5	8	10	17	20
Air change at 150 °C/302 °F (x/h)	43	32	20	18	12
Electrical data					
Housing protection acc. to EN 60529	IP 20	IP 20	IP 20	IP 20	IP 20
Nominal voltage (±10 %) 50/60 Hz (V)	230 1 N ~	230 1 N ~	230 1 N ~	400 3 N ~	400 3 N ~
Nominal power (kW)	1.2	1.6	2.7	3.4	5
Energy consumption at 150 °C/302 °F (Wh/h)	397	544	850	1200	1320
Model no.					
	9010-0210	9010-0212	9010-0214	9010-0216	9010-0218

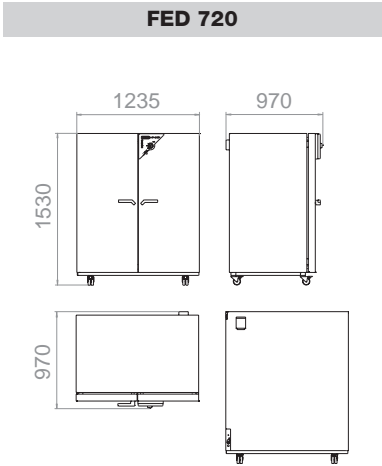
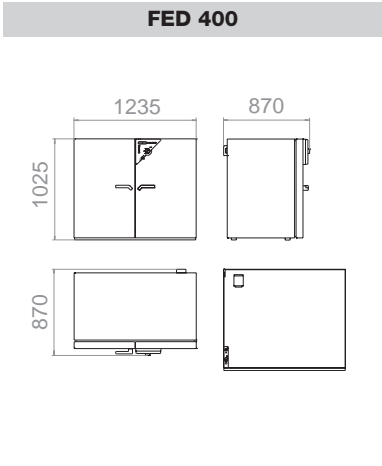
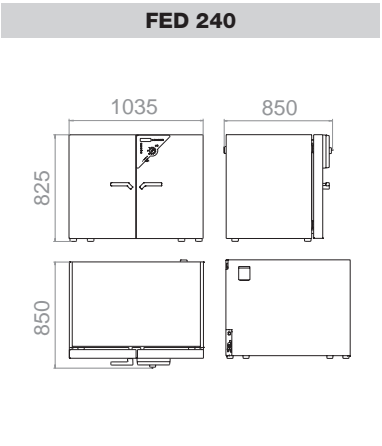
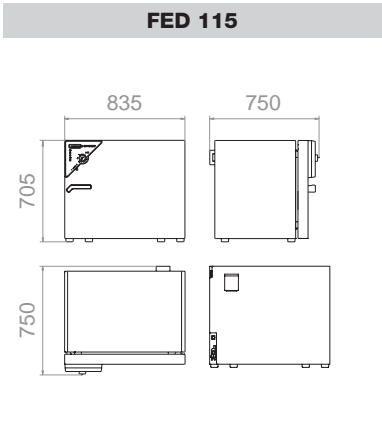
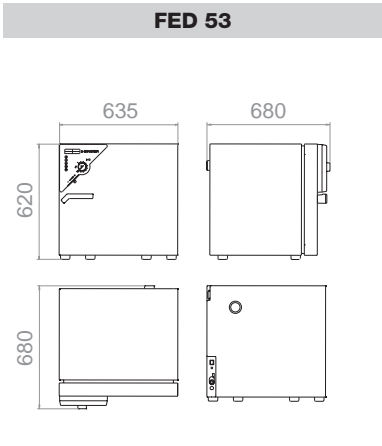
¹⁾ value without window // ²⁾ to 98 % of the set value /// All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a voltage fluctuation of ±10 %.

The temperature data are determined in accordance with factory standard following DIN 12880 respecting the recommended wall clearances of 10 % of the height, width and depth of the inner chamber.

All indications are average values, typical for units produced in series. We reserve the right to change technical specifications at any time.



► DIMENSIONS



► INSTALLATION REQUIREMENTS

	FED 53	FED 115	FED 240	FED 400	FED 720
Nominal voltage ($\pm 10\%$) 50/60 Hz (V)	230 1 N ~	230 1 N ~	230 1 N ~	400 3 N ~	400 3 N ~
Nominal power (kW)	1.2	1.6	2.7	3.4	5.0

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Material testing

FP | M series

Proven experts: BINDER Material test chambers

- ▶ Proven level of performance
 - ▶ Fan with increased airflow rate
 - ▶ Adjustable rapid air exchange rate

- ▶ Proven precision
 - ▶ High standard according to DIN 12880 (27-point measurement)
 - ▶ The specialists for demanding heating profiles
 - ▶ Uniform test conditions throughout the chamber interior

- ▶ Proven versatility
 - ▶ Communication interface
 - ▶ Digital multi-program controller
 - ▶ Adjustable ventilation, program-controlled (M series)

For demanding heating profiles, these chambers show what they're made of: Best APT.line™ preheating chamber for maximum precision, wide temperature range and comprehensive programming options, with which you can customize ramps, profiles and processes.



Tempering of seals



Drying of electronic components



Plastics testing

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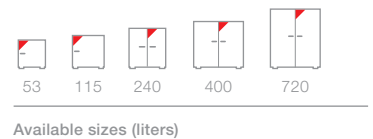
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Material test chambers with mechanical convection FP series

The FP series carries out the most demanding tests and scores particularly well with its comprehensive programming options. The mechanical (forced) convection provides reliably short drying and extremely fast heating times – even and especially for chambers under full loads.

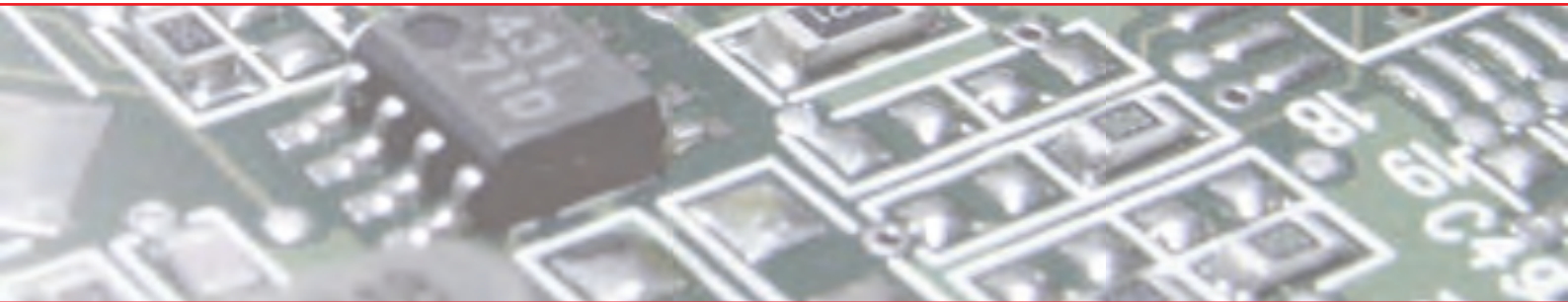


► FP 115 model



► EQUIPMENT

- Temperature range from 5 °C above ambient temperature to 300 °C
- MP controller with 2 programs with 10 sections each, alternatively switchable to program with 20 segments
- The time of an individual program step can be set to max. 999 hours and 59 minutes.
- Adjustable ramp function via program editor
- Integrated weekly program timer with real-time function
- Digital temperature setting accurate to tenths of a degree or to one degree
- Adjustable fan speed
- Adjustable ventilation by means of front ventilation flap slide and rear exhaust Ø 50 mm
- Elapsed time indicator
- Independent adjustable temperature safety device class 2 (DIN 12880), with visual temperature alarm
- RS 422 interface for APT-COM™ DataControlSystem communication software
- Units up to 115 liters are stackable
- Two chrome-plated racks included



► FP SERIES | BEST TEST RESULTS:



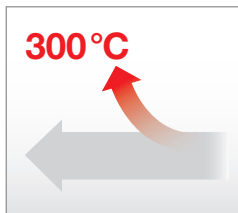
Uniform test conditions

- ▶ APT.line™ preheating chamber
 - Homogeneous temperature distribution
 - Identical test conditions throughout the chamber interior independent of sample size and quantity



Convenient work environment

- ▶ Hermetic door closure with 2-points door closure
- ▶ Low heat dissipation due to 60 mm insulation
- ▶ Rack with tilt protection for easy loading and unloading
- ▶ Complete stainless steel inner chamber
- ▶ No permanent fixtures



Broad range of applications

- ▶ Rapid air exchange rate and large capacity reserves
- ▶ Adjustable fan speed
- ▶ Short heating up times



Best quality and precision guaranteed

- ▶ High standard according to DIN 12880 (27-point measurement)
- ▶ Short delivery times
- ▶ Minimal maintenance and operating costs

► OPTIONS

- Access ports with silicone plugs
- Racks, chrome-plated or stainless steel
- Perforated shelf, stainless steel
- Reinforced rack, stainless steel
- Reinforced inner chamber with 2 reinforced racks
- Independent temperature safety device class 3.1 according to DIN 12880
- Door with window and interior lighting
- Door lock
- Analog output for temperature 4 - 20 mA with 6-pin DIN socket including DIN connector
- Additional measuring channel for display of specimen temperature (PT 100 sensor)
- Temperature measurement according to DIN 12880
- HEPA fresh-air filter, class EU 14
- Increased air exchange rate through high-performance fan
- Measurement of air exchange rate according to ASTM D5374
- Isolated switching outputs (6-pin DIN socket)
- Calibration certificate
- Extension to calibration certificate
- Data Logger Kits and Logger software



Door with heated viewing window with interior lighting



Calibrations and validations



Access ports with silicone plugs



Test chamber with special racks and modified airflow

► **BINDER INDIVIDUAL**
More information on page 133

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Technical data for your planning and installation

FP series

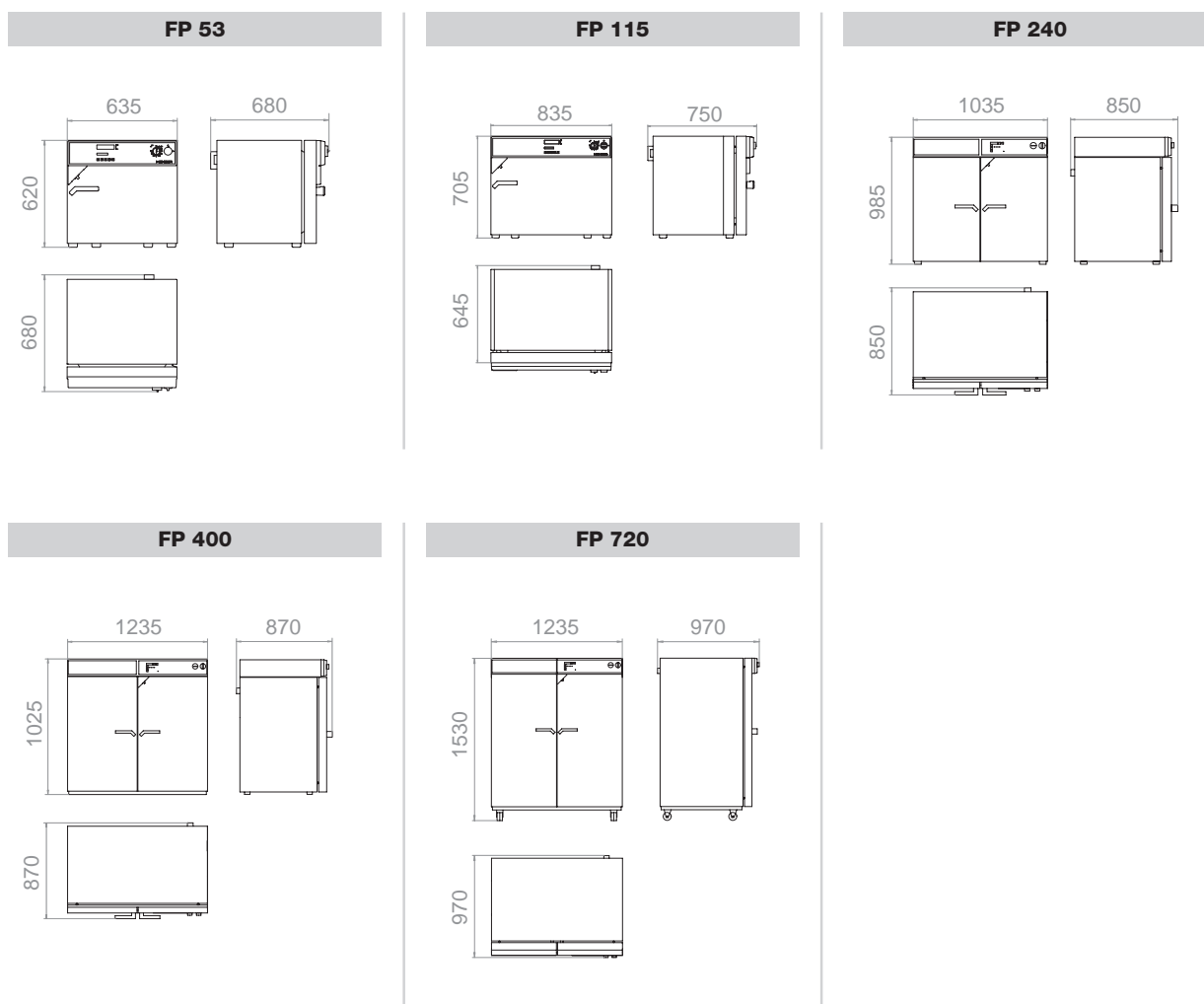


	FP 53	FP 115	FP 240	FP 400	FP 720
Exterior dimensions					
Width (mm/inch)	635 / 25.0	835 / 32.87	1035 / 40.75	1235 / 48.62	1235 / 48.62
Height (including feet/castors) (mm/inch)	620 / 24.41	705 / 27.76	825 / 32.48	1025 / 40.35	1530 / 60.24
Depth (mm/inch)	575 / 22.64	645 / 25.39	745 / 29.33	765 / 30.12	865 / 34.06
plus door handle, I-panel and exhaust duct (mm/inch)	105 / 4.13	105 / 4.13	105 / 4.13	105 / 4.13	105 / 4.13
Number of doors	1	1	2	2	2
Interior dimensions					
Width (mm/inch)	400 / 15.75	600 / 23.62	800 / 31.50	1000 / 39.37	1000 / 39.37
Height (mm/inch)	400 / 15.75	480 / 18.90	600 / 23.62	800 / 31.50	1200 / 47.24
Depth (mm/inch)	340 / 13.39	410 / 16.14	510 / 20.08	510 / 20.08	610 / 24.02
Interior volume (l/cu.ft.)	53 / 1.9	115 / 4.1	240 / 8.6	400 / 14.3	720 / 25.7
Number of racks (standard/max.)	2 / 5	2 / 6	2 / 7	2 / 10	2 / 15
Load per rack (kg/lbs.)	15 / 33	20 / 44	30 / 66	35 / 77	45 / 99
Permitted total load (kg/lbs.)	40 / 88	50 / 110	70 / 155	90 / 199	120 / 265
Weight of the unit (empty) (kg/lbs.)	45 / 99	62 / 137	98 / 216	145 / 320	184 / 406
Temperature data					
Temperature range, 5 °C/9 °F above ambient up to °C/°F	300 / 572	300 / 572	300 / 572	300 / 572	300 / 572
Temperature uniformity ¹⁾ at 150 °C/302 °F (±K)	2.0	1.8	2.0	2.5	2.0
Temperature fluctuation (±K)	0.3	0.3	0.3	0.3	0.3
Heating-up time ²⁾ to 150 °C/302 °F (min)	24	30	27	35	39
Recov. time after door was opened for 30 sec. ²⁾ at 150 °C/302 °F (min)	5	8	10	17	20
Air change at 150 °C/302 °F (x/h)	64	32	20	18	12
Electrical data					
Housing protection acc. to EN 60529	IP 20	IP 20	IP 20	IP 20	IP 20
Nominal voltage (±10 %) 50/60 Hz (V)	230 1 N ~	230 1 N ~	230 1 N ~	400 3 N ~	400 3 N ~
Nominal power (kW)	1.2	1.6	2.7	3.4	5.0
Energy consumption at 150 °C/302 °F (Wh/h)	300	544	850	1200	1320
Model no.					
	9010-0153	9010-0255	9010-0263	9010-0265	9010-0267

¹⁾ value without window // ²⁾ to 98 % of the set value /// All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a voltage fluctuation of ±10 %. The temperature data are determined in accordance with factory standard following DIN 12880 respecting the recommended wall clearances of 10 % of the height, width and depth of the inner chamber. All indications are average values, typical for units produced in series. We reserve the right to change technical specifications at any time.



► DIMENSIONS



► INSTALLATION REQUIREMENTS

	FP 53	FP 115	FP 240	FP 400	FP 720
Nominal voltage ($\pm 10\%$) 50/60 Hz (V)	230 1N~	230 1N~	230 1N~	400 3N~	400 3N~
Nominal power (kW)	1.2	1.6	2.7	3.4	5.0

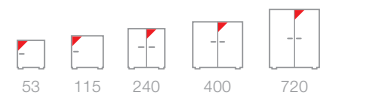


Temperature test chambers with individual programming M series

With a maximum temperature of 300 °C and comprehensive programming options, the M series is ideally suited for material and accelerated aging testing. The particularly powerful airflow rate and programmable exhaust air valve ensure fast heating, and test temperatures are maintained at a level with minimal spatial fluctuations more accurately than ever before.



► M 720 model



Available sizes (liters)

► EQUIPMENT

- Temperature range from 5 °C above ambient temperature to 300 °C
- MCS screen controller which can store 25 programs of 100 sections each for a maximum of 500 program segments:
 - User-friendly LCD screen
 - Easy-to-read menu guidance
 - Integrated electronic chart recorder
 - Variety of options for the graphic display of process parameters
 - Real-time clock
- Adjustable ramp function via program editor
- Program-controlled ventilation flap
- High air exchange rate through high-performance fan
- Adjustable fan speed
- Exhaust duct Ø 50 mm
- Independent adjustable temperature safety device class 2 (DIN 12880), with visual temperature alarm
- RS 422 interface for APT-COM™ DataControlSystem communication software
- Units up to 115 liters are stackable
- Two chrome-plated racks included

► M SERIES | BEST TEST RESULTS:



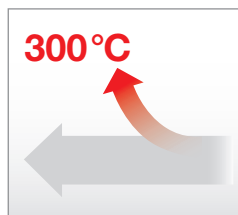
Uniform test conditions

- ▶ APT.line™ preheating chamber
 - Homogeneous temperature distribution
 - Same test conditions throughout the chamber interior independent of sample size and quantity



Best quality and precision guaranteed

- ▶ High standard according to DIN 12880 (27-point measurement)
- ▶ Short delivery times
- ▶ Minimal maintenance and operating costs



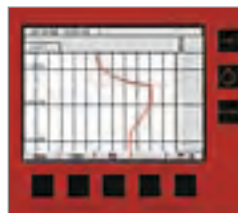
Broad range of applications

- ▶ High air exchange rate and large power reserves
- ▶ Adjustable fan speed
- ▶ Short heating up times



Convenient work environment

- ▶ Hermetic door closure with 2-points door closure
- ▶ Low heat dissipation due to 60 mm insulation
- ▶ Rack with tilt protection for easy loading and unloading
- ▶ Complete stainless steel inner chamber
- ▶ No permanent fixtures



Custom programming

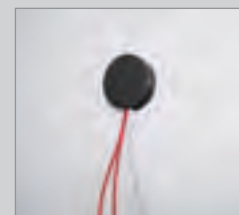
- ▶ Controller with color display which can store 25 programs
- ▶ Integrated digital continuous-line recorder for monitoring limits and alarm function
- ▶ Convenient documentation
- ▶ All displayed values read at a glance

► OPTIONS

- Access ports with silicone plugs
- Racks, chrome-plated or stainless steel
- Perforated shelf, stainless steel
- Reinforced rack, stainless steel
- Reinforced inner chamber with 2 reinforced racks
- Door with window and interior lighting
- Door lock
- Analog output for temperature 4 - 20 mA with 6-pin DIN socket
- Additional measuring channel for display of specimen temperature (PT 100 sensor)
- Inert gas connection (gas inlet and outlet)
- Temperature measurement according to DIN 12880
- HEPA fresh-air filter, class EU 14
- Ventilation measurement according to ASTM D5374 with definition and protocol
- Calibration certificate
- Extension to calibration certificate
- Data Logger Kits and Logger software



Reinforced shelves



Various access ports



Data Logger Kits



Test chamber with electrical door lock

► **BINDER
INDIVIDUAL**
More information
on page 133

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Technical data for your planning and installation

M series



	M 53	M 115	M 240	M 400	M 720
Exterior dimensions					
Width (mm/inch)	635 / 25.0	835 / 32.87	1035 / 40.75	1235 / 48.62	1235 / 48.62
Height (including feet/castors) (mm/inch)	780 / 30.71	865 / 34.06	985 / 38.78	1185 / 46.65	1695 / 66.73
Depth (mm/inch)	575 / 22.64	645 / 25.39	745 / 29.33	765 / 30.12	865 / 34.06
plus door handle, l-panel and exhaust duct (mm/inch)	105 / 4.13	105 / 4.13	105 / 4.13	105 / 4.13	105 / 4.13
Quantity of doors	1	1	2	2	2
Interior dimensions					
Width (mm/inch)	400 / 15.75	600 / 23.62	800 / 31.50	1000 / 39.37	1000 / 39.37
Height (mm/inch)	400 / 15.75	480 / 18.90	600 / 23.62	800 / 31.50	1200 / 47.24
Depth (mm/inch)	340 / 13.39	410 / 16.14	510 / 20.08	510 / 20.08	610 / 24.02
Interior volume (mm/inch)	53 / 1.9	115 / 4.1	240 / 8.6	400 / 14.3	720 / 25.7
Quantity of racks (standard/max.)	2 / 5	2 / 6	2 / 7	2 / 10	2 / 15
Load per rack (kg/lbs.)	15 / 33	20 / 44	30 / 66	35 / 77	45 / 99
Permitted total load (kg/lbs.)	40 / 88	50 / 110	70 / 155	90 / 199	120 / 265
Weight of the unit (empty) (kg/lbs.)	61 / 135	89 / 196	131 / 289	173 / 382	203 / 448
Temperature data					
Temperature range, 5 °C/9 °F above ambient up to °C/°F	300 / 572	300 / 572	300 / 572	300 / 572	300 / 572
Temperature uniformity ¹⁾ at 150 °C/302 °F (±K)	1.3	1.5	1.5	1.5	1.9
Temperature fluctuation (±K)	0.3	0.3	0.3	0.3	0.3
Heating-up time ²⁾ to 150 °C/302 °F (min)	15	16	19	18	21
Recov. time after door was opened for 30 sec. ¹⁾²⁾ at 150 °C/302 °F (min)	3	3	3	3	3
Air change at 150 °C/302 °F (x/h)	192	96	60	54	36
Electrical data					
Housing protection acc. to EN 60529	IP 20	IP 20	IP 20	IP 20	IP 20
Nominal voltage (±10 %) 50/60 Hz (V)	230 1 N ~	230 1 N ~	230 1 N ~	400 3 N ~	400 3 N ~
Nominal power (kW)	1.2	1.6	2.7	3.4	5.0
Energy consumption at 150 °C/302 °F (Wh/h)	300	544	850	1200	1320
Model no.					
	9010-0201	9010-0202	9010-0203	9010-0204	9010-0205

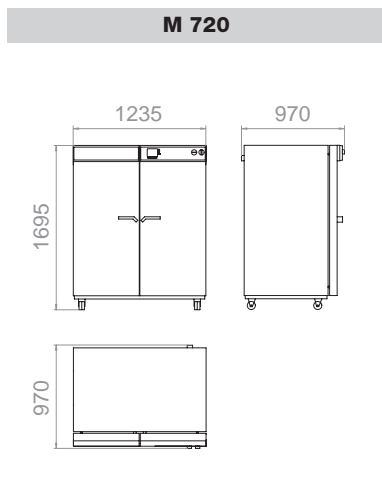
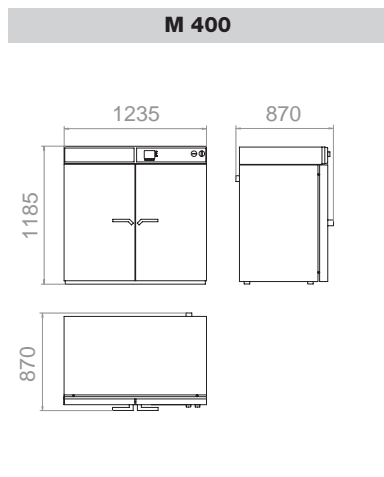
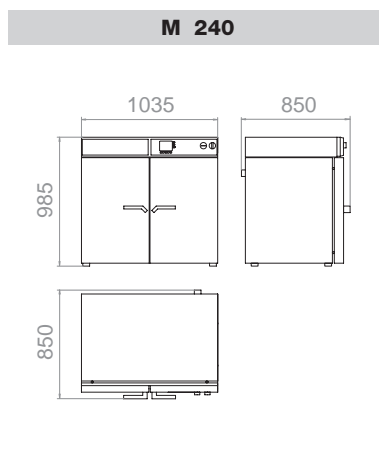
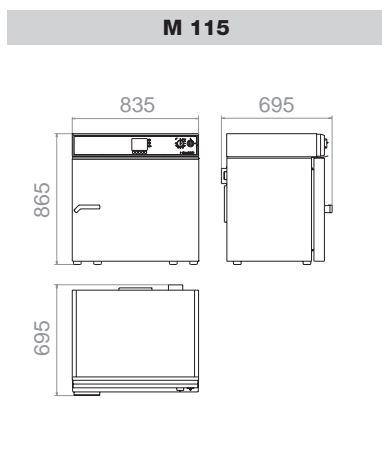
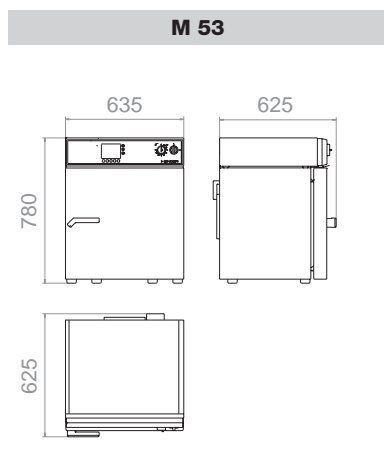
¹⁾ without glass door // ²⁾ to 98 % of the set value /// All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a voltage fluctuation of ±10 %.

The temperature data are determined in accordance with factory standard following DIN 12880 respecting the recommended wall clearances of 10 % of the height, width and depth of the inner chamber.

All indications are average values, typical for units produced in series. We reserve the right to change technical specifications at any time.



► DIMENSIONS



► INSTALLATION REQUIREMENTS

	FP 53	FP 115	FP 240	FP 400	FP 720
Nominal voltage ($\pm 10\%$) 50/60 Hz (V)	230 1N~	230 1N~	230 1N~	400 3N~	400 3N~
Nominal power (kW)	1.2	1.6	2.7	3.4	5.0

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Safety drying

FDL | MDL series

Unconditionally good: BINDER Safety drying ovens

- ▶ Unconditionally accurate
 - ▶ Fast, uniform drying
 - ▶ Wide temperature range up to 350 °C
 - ▶ Low heat dissipation due to 60 mm insulation
 - ▶ Specimen temperature display with temperature sensor
- ▶ Unconditionally safe
 - ▶ Meets EN 1539: Fresh air monitoring with automatic switchoff
 - ▶ Safety class IP 33
 - ▶ Hermetic door with 2-points door closure
- ▶ Unconditionally versatile
 - ▶ Extension for coil coating test available for MDL series
 - ▶ Digital multi-program controller
 - ▶ Communication interface

For the perfect finish to your solvent-based paints and coating materials, we offer you two series. Absolute temperature accuracy with a high air exchange rate and thus the basis for the best results qualitatively and reproducible tests. You can work safely at all times thanks to replaceable fresh air cartridges and electronic monitoring.



Surface technology / Coating materials



Drying adhesives

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Safety drying ovens

FDL series

This series provides the perfect environment for all specimens containing solvents: the high efficiency filter cartridge and symmetric airflow provide a silicone free and dust-free inner chamber. The FDL meets all EN 1539 requirements and also ensures maximum work safety with the intelligent fresh air monitoring program.



► FDL 115 model



115

Available size (liters)

► EQUIPMENT

- All safety features compliant with EN 1539
- Temperature range from 5 °C above ambient temperature to 300 °C
- MP controller with 2 programs with 10 sections each, or alternatively one program with 20 sections
- The time of an individual program step can be set to max. 999 hours and 59 minutes
- Integrated weekly program timer with real-time function
- Digital temperature setting with an accuracy of one or a tenth of a degree
- Elapsed time indicator
- Door gasket made of FKM (up to max. 200 °C)
- Replaceable fresh-air filter cartridge, class F6 (EU6 fine particle filter for particle sizes between 1 µm and 10 µm)
- Independent adjustable temperature safety device class 2 (DIN 12880), with audible and visual alarm
- Fresh-air monitoring with audible and visual alarm and automatic deactivation of heating
- Rear exhaust connector Ø 100 mm
- RS 422 interface for APT-COM™ DataControlSystem communication software
- Two chrome-plated racks included

► FDL SERIES | BEST TEST RESULTS:



Uniform test conditions

- APT.line™ preheating chamber
 - Homogeneous temperature distribution
 - Identical test conditions throughout the chamber interior independent of sample size and quantity



Convenient work environment

- Hermetic door closure with 2-points door closure
- Low heat dissipation due to 60 mm insulation
- Rack with tilt protection
- Complete stainless steel inner chamber
- No permanent fixtures
- Silicone free

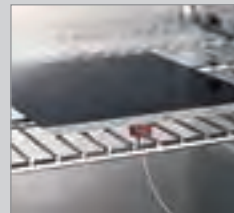


Maximum work safety

- Defined solvent quantity meets drying safety standards
- EN 1539 compliant: Fresh air monitoring with automatic switchoff
- Safety class IP 33
- Easy to replace fresh air filter

► **OPTIONS**

- Access ports, Ø 10 mm, Ø 30 mm, right, left
- Racks, chrome-plated or stainless steel
- Perforated shelf, stainless steel
- Specimen temperature display with temperature sensor and analog output 4 – 20 mA
- Replacement air filter (class F6/EU6 for particle sizes between 1 µm and 10 µm)
- Door lock
- Door gasket made of silicone for applications > 200 °C
- Calibration certificate, measurement in center
- Extension to factory calibration certificate (additional measuring point)
- Temperature measurement according to DIN 12880



Temperature measurement of the specimen



Calibrations and validations



Various access ports



Safety drying oven with UV lamp for testing UV resistance

► **BINDER
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Technical data for your planning and installation

FDL series



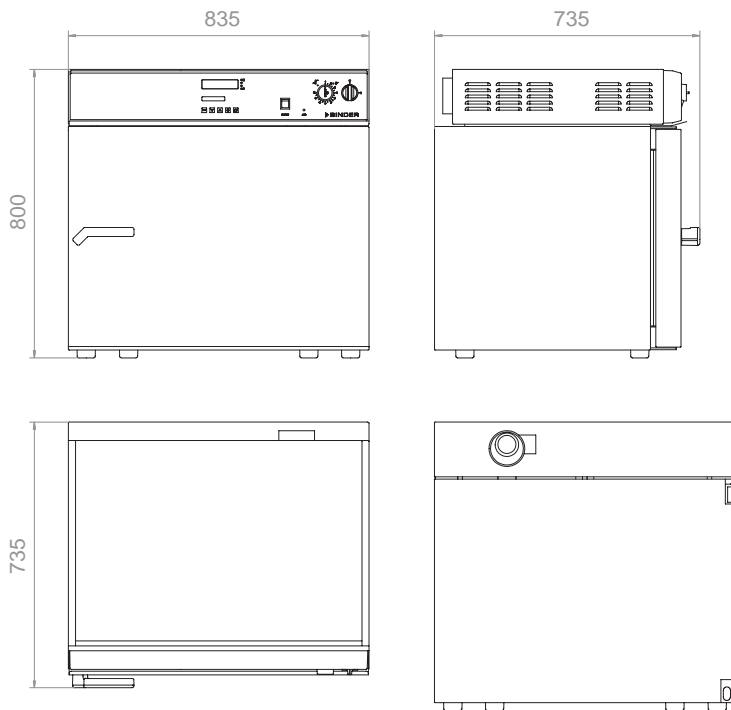
	FDL 115
Exterior dimensions	
Width (mm/inch)	835 / 32.87
Height (including feet) (mm/inch)	800 / 31.50
Depth (mm/inch)	685 / 26.97
plus door handle (mm/inch)	50 / 1.97
Interior dimensions	
Width (mm/inch)	600 / 23.62
Height (mm/inch)	435 / 17.13
Depth (mm/inch)	435 / 17.13
Interior volume (l/cu.ft.)	115 / 4.1
Quantity of racks (standard/max.)	2 / 5
Load per rack (kg/lbs.)	20 / 44
Permitted total load (kg/lbs.)	50 / 110
Weight of the unit (empty) (kg/lbs.)	90 / 199
Temperature data	
Temperature range, 5 °C/9 °F above ambient up to °C/°F	300 / 572
Temperature uniformity at 150 °C/302 °F (±K)	2.5
Temperature fluctuation (±K)	0.3
Heating-up time ²⁾ at 150 °C/302 °F (min.)	17
Recov. time after door was opened for 30 sec. ²⁾ at 150 °C/302 °F (min.)	3
Air change (approx. x/min.)	3
Air circulation (approx. x/min.)	40
Exhaust air volume flow (approx. L/Min. m ³ /h)	400 (24.0)
Air flow velocity (m/sec)	0.8 – 1.2
Highest permitted solvent quantity (g) (at T-180 °C, M-100 g/mol, U-40 g/m ³ , K=0,5)	6.65
Electrical data	
Housing protection acc. to EN 60529	IP 33
Nominal voltage (+10 %) 50/60 Hz (V)	230
Nominal power (kW)	2.9
Energy consumption at 150 °C/302 °F (Wh/h)	1098
Model no.	9010-0269

¹⁾ value without window // ²⁾ to 98 % of the set-point value /// All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a voltage fluctuation of ±10 %. The temperature data are determined in accordance with factory standard following DIN 12880 respecting the recommended wall clearances of 10 % of the height, width and depth of the inner chamber. All indications are average values, typical for units produced in series. We reserve the right to change technical specifications at any time.



► DIMENSIONS

FDL 115



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► INSTALLATION REQUIREMENTS

	FDL 115
Nominal voltage (+10 %) 50/60 Hz (V)	230
Nominal power (kW)	2.9

Safety drying ovens with expanded temperature range

MDL series

The MDL series works at temperatures up to 350 °C and at an extremely high airflow rate. It is perfectly suited for high-temperature testing such as in the coil coating testing sector. The preheating chamber technology with special airflow design allows evenly distributed burn-in over a very short period – and all that with maximum work safety due to electronic fresh air monitoring. The customized programming also gives you all the freedom you need for your work.



► MDL 115 model



115

Available size (liters)

► EQUIPMENT

- Compliant with all EN 1539 safety requirements
- Temperature range from 5 °C above ambient temperature to 350 °C
- MCS controller which can store 25 programs of 100 sections each for a maximum of 500 program segments
 - User-friendly LCD screen
 - Easy-to-read menu guidance
 - Integrated electronic chart recorder
 - Variety of options for the graphic display of process parameters
 - Real-time clock
- Heating output 9.0 kW
- Door gasket made of high temperature resistant silicone
- Rear exhaust connector Ø 100 mm
- Replaceable fresh-air filter cartridge, class F6 (EU6 fine particle filter for particle sizes between 1 µm and 10 µm)
- Independent adjustable temperature safety device class 2 (DIN 12880), with audible and visual alarm
- Fresh-air monitoring with audible and visual alarm and automatic heating feature deactivation
- RS 422 interface for APT-COM™ DataControlSystem communication software
- Two chrome-plated racks included

► MDL SERIES | BEST TEST RESULTS:



Uniform test conditions

- ▶ APT.line™ preheating chamber
 - Homogeneous temperature distribution
 - Identical test conditions throughout the chamber interior independent of sample size and quantity



Convenient work environment

- ▶ Hermetic door closure with 2-points door closure
- ▶ Low heat dissipation due to 60 mm insulation
- ▶ Rack with tilt protection
- ▶ Complete stainless steel inner chamber
- ▶ No permanent fixtures



Maximum work safety

- ▶ Defined solvent quantity meets drying safety standards
- ▶ EN 1539 compliant: Fresh air monitoring with automatic switchoff
- ▶ Safety class IP 33
- ▶ Easy to replace fresh air filter



Custom programming

- ▶ Controller with color display which can store 25 programs
- ▶ Integrated digital continuous-line recorder for monitoring limits and alarm function
- ▶ Convenient documentation
- ▶ All measured values read at a glance

► **OPTIONS**

- Racks, chrome-plated or stainless steel
- Perforated shelf, stainless steel
- Extension in the door for coil coating tests
- Replacement air filter (class F6/EU6 for particle sizes between 1 µm and 10 µm)
- Additional measuring channel for digital display of specimen temperature with clip temperature sensor
- Door lock
- Lockable controller keyboard
- Calibration certificate, measurement in center
- Extension to factory calibration certificate (additional measuring point)
- Temperature measurement according to DIN 12880



Temperature measurement of the specimen



Extension for coil coating applications



Calibrations and validations



Safety drying oven with HEPA fresh-air filter EU 14

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Technical data for your planning and installation

MDL series



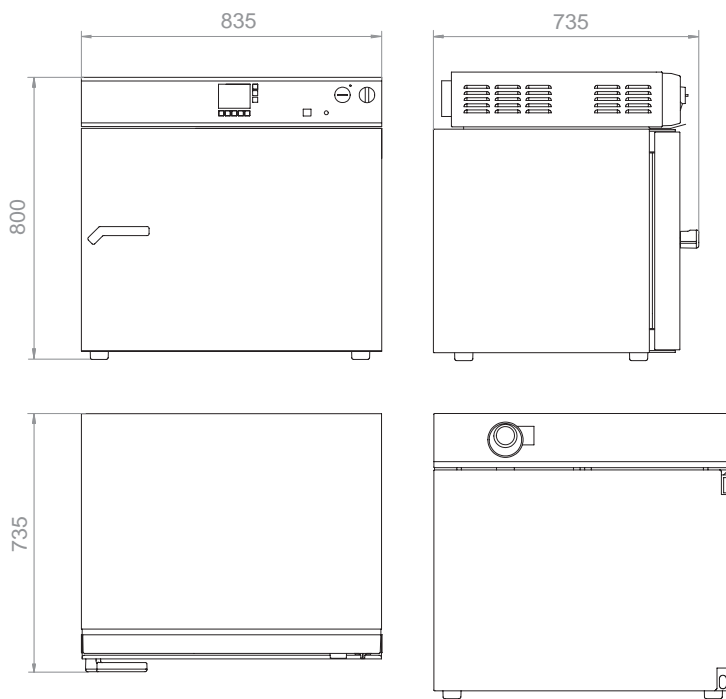
	MDL 115
Exterior dimensions	
Width (mm/inch)	835 / 32.87
Height (including feet) (mm/inch)	800 / 31.50
Depth (mm/inch)	685 / 26.97
plus door handle (mm/inch)	50 / 1.97
Interior dimensions	
Width (mm/inch)	600 / 23.62
Height (mm/inch)	435 / 17.13
Depth (mm/inch)	435 / 17.13
Interior volume (l/cu.ft.)	115 / 4.1
Quantity of racks (standard/max.)	2 / 5
Load per rack (kg/lbs.)	20 / 44
Permitted total load (kg/lbs.)	50 / 110
Weight of the unit (empty) (kg/lbs.)	90 / 199
Temperature data	
Temperature range, 5 °C/9 °F above ambient up to °C/°F	350 / 662
Temperature uniformity at 150 °C/302 °F (±K)	3.4
Temperature uniformity with door flap at 150 °C/302 °F (±K)	3
Temperature fluctuation (±K)	0.5
Heating-up time ²⁾ at 150 °C/302 °F (minutes)	6
Recov. time after door was opened for 30 sec. ²⁾ at 150 °C/302 °F (minutes)	2
Recov. time after door was opened for 30 sec. ²⁾ with door flap, at 150 °C/302 °F (minutes)	1
Air change (approx. x/min.)	3
Air circulation (approx. x/min.)	40
Exhaust air volume flow (approx. L/Min. m³/h)	400 (24.0)
Air flow velocity (m/sec)	0.8 – 1.2
Highest permitted solvent quantity (g) (at T-180 °C, M-100 g/mol, U-40 g/m ³ , K=0,5)	6.65
Electrical data	
Housing protection acc. to EN 60529	IP 33
Nominal voltage (+10 %) 50/60 Hz (V)	400 V / 3N~
Nominal power (kW)	9
Energy consumption at 150 °C/302 °F (Wh/h)	1130
Model no.	9010-0200

¹⁾ value without window // ²⁾ to 98 % of the set-point value /// All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a voltage fluctuation of ±10 %. The temperature data are determined in accordance with factory standard following DIN 12880 respecting the recommended wall clearances of 10 % of the height, width and depth of the inner chamber. All indications are average values, typical for units produced in series. We reserve the right to change technical specifications at any time.



► DIMENSIONS

MDL 115



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► INSTALLATION REQUIREMENTS

	MDL 115
Nominal voltage ($\pm 10\%$) 50/60 Hz (V)	400 V / 3N~
Nominal power (kW)	9



Vacuum drying

VD | VDL series

Extremely superior: BINDER Vacuum drying ovens

- ▶ Extremely fast
 - ▶ Direct heat transfer to the sample material through thermal conducting plates
 - ▶ Fast, condensation-free drying processes
 - ▶ Homogeneous sample drying
- ▶ Extremely safe
 - ▶ VDL series with explosion-proof inner chamber (ATEX compliant)
 - ▶ Maximum specimen protection with adjusted overshooting
 - ▶ Ensures optimal work safety through its one-of-a-kind safety concept
- ▶ Extremely durable
 - ▶ Inner chamber made of highly corrosion resistant stainless steel V4A (1.4571)
 - ▶ Coordinated, modular system
 - ▶ Application-specific Vacuum chemical membrane pumps

Both VD and VDL ovens can dry samples completely without residues, scaling or oxidation, and this is achieved in overdrive. Depending on your individual safety requirements, our unique safety concept sets a new standard and is combined with a first-rate performance and quality.



Semiconductors / Electronics



Chemistry / Plastic



Precision engineering

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Vacuum drying ovens for non-flammable solvents VD series

The VD series makes a strong impression with its drying abilities which provide a homogeneous temperature distribution ensured by its electronically controlled APT.line™ preheating chamber. The patented shelf expansion technology guarantees optimal heat transfer. The shelves are easy to clean and provide a flexible positioning.



► VD 53 model



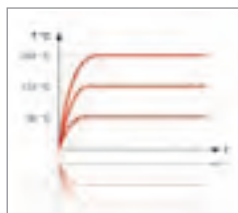
23 53 115

Available sizes (liters)

► EQUIPMENT

- Temperature range from 15 °C above ambient temperature to 200 °C
- MP controller with two programs with 10 sections each or switchable to one program with 20 sections
- Integrated weekly program timer with real-time function
- Digital temperature setting with an accuracy of one degree
- Precision-adjustable ventilation valve (for VD 23, the inert gas connection is also used as the ventilation valve)
- Precision-adjustable inert gas valve with Cross-Flow Technology
- All electrical components are decoupled from the inner chamber
- Spring-mounted safety glass panel with shatter protection
- Independent adjustable temperature safety device class 2 (DIN 12880), with visual temperature alarm
- Analog pressure gauge (displays pressure difference between the inner chamber and ambient pressure)
- Electro polished inner chamber, suction and ventilation tubes, pressure container, expansion racks and ball valve are made of highly corrosion resistant stainless steel V4A (1.4571)
- Door gasket made of tempered silicone
- Two x 24 V DC (max 0.4 A) switching outputs, switched via two control contacts in the program editor
- RS 422 interface for APT-COM™ DataControlSystem communication software
- Two patented, flexible aluminum expansion racks
- Also available as complete system with module and vacuum pump

► **VD SERIES | FAST AND CONDENSATION-FREE DRYING PROCESS:**



Process stability for perfect results

- Innovative control concept for regulation of the entire temperature range without overshooting
 - Short heating up times
 - Easy operation
- APT.line™ preheating chamber
 - Gentle drying throughout the chamber interior
 - Direct heat transfer through large thermal conducting plates
 - Patented, flexible positioning of the expansion racks



Accelerated drying process

- BINDER Cross-Flow Principle
- Even flow throughout the inner chamber from bottom to top
- Finely adjustable inert gas valve without turbulence for lighter samples
- Individually controlled



Convenient, safe work environment

- BINDER Complete system
- Coordinated, modular system consisting of vacuum drying oven, application-specific vacuum pumps and vacuum module.
 - Connection kit for easy assembly
 - Optimal working height
 - Low noise
 - Pressure and temperature profiles are depicted simultaneously



Tested security

- BINDER safety concept
- Spring-mounted safety glass panel with shatter protection
- Standard inert gas connection for interior flushing
- Electronic components are decoupled from the inner chamber



Simple, time-saving cleaning

- Smooth inner chamber with rounded corners
- Inner chamber and all connections made of highly corrosion resistant stainless steel V4A (1.4571)
 - Fixtures are fully removable

► **OPTIONS**

- Expansion racks, stainless steel
- Connection kit with various small-flange components
- Measuring port for vacuum-tight access port of measuring lines into the device (9-pin)
- Temperature measurement of the specimen with flexible PT 100 sensor and digital specimen temperature display
- Digital pressure display, measuring range from 1 mbar to atm. pressure, display accuracy 1 mbar
- Calibration certificates
- Extension to calibration certificate (additional measuring points)
- Door gasket, FKM (Viton)
- Vacuum module with chemical membrane pump VP 1.1
- Vacuum module with chemical membrane pump VP 2.1
- Vacuum module with speed-controlled chemical membrane pump VP 3.1
- Vacuum module for installation of vacuum pumps
- Measuring port
- Specimen temperature display with PT 100 sensor
- Validations and calibrations
- Vacuum drying oven with special racks for large numbers of particularly flat samples



Measuring port



Specimen temperature display with PT 100 sensor



Validations and calibrations



Vacuum drying oven with special racks for large numbers of particularly flat samples

► **BINDER INDIVIDUAL**
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Technical data for your planning and installation

VD series



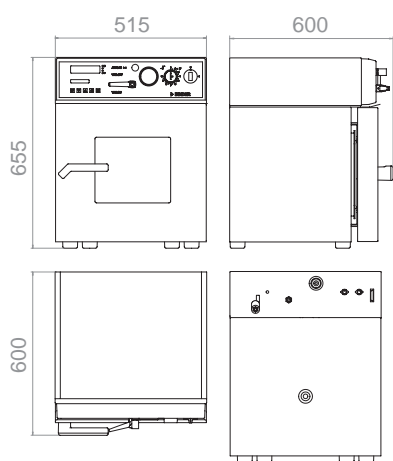
	VD 23	VD 53	VD 115
Exterior dimensions			
Width VD (mm/inch)	515 / 20.28	635 / 25.0	740 / 29.13
Height VD (including feet) (mm/inch)	655 / 25.79	775 / 30.51	900 / 35.43
Total height VD + option "vacuum module" (mm/inch)	1280 / 50.39	1400 / 55.12	1525 / 60.04
Depth incl. door handle, connection (mm/inch)	600 / 23.62	650 / 25.59	770 / 30.31
Interior dimensions			
Width (mm/inch)	285 / 11.22	400 / 15.75	506 / 19.92
Height (mm/inch)	285 / 11.22	400 / 15.75	506 / 19.92
Depth (mm/inch)	295 / 11.61	340 / 13.39	460 / 18.11
Interior volume (l/cu.ft.)	23 / 0.81	53 / 1.87	115 / 4.06
Quantity of expansion racks (aluminum) (standard/max.)	2 / 4	2 / 5	2 / 6
Load per rack (kg/lbs.)	20 / 44	20 / 44	20 / 44
Permitted total load (kg/lbs.)	35 / 77	45 / 99	65 / 143
Weight of the unit (empty) (kg/lbs.)	63 / 139	95 / 210	153 / 338
Temperature data			
Temperature range, 15 °C/27 °F above ambient up to °C/°F	200 / 392	200 / 392	200 / 392
Temperature uniformity ¹⁾ at 100 °C/212 °F (±K)	1.5	2	3.5
Temperature fluctuation ¹⁾ (±K)	0.1	0.1	0.1
Heating up time ^{1) 2)} to 100 °C (min.) Position POWER	65	80	95
Permitted end vacuum (mbar / inchHg)	0,01 / 0.000295	0,01 / 0.000295	0,01 / 0.000295
Leak rate max. (bar/h / inHg/h)	0,01 / 2.95	0,01 / 2.95	0,01 / 2.95
Electrical data VD			
Housing protection acc. to EN 60529	IP 20	IP 20	P 20
Nominal voltage (±10 %) 50/60 Hz (V)	230	230	230
Nominal power (kW)	0.8	1.2	1.9
Energy consumption at 100 °C (Wh/h)	105	150	250
Model no.	9030-0029	9030-0030	9030-0031
Electrical data VD-UL			
Nominal voltage (±10 %) 60 Hz (V)	115	115	115
Nominal current (A)	10.5	14.8	7.0
Nominal power (kW)	1.2	1.7	0.8
Model no. UL unit	9030-0035	9030-0036	9030-0037

¹⁾ values measured with aluminum racks // ²⁾ to 98 % of the set-point value /// All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a voltage fluctuation of ±10 %. The temperature data are determined in accordance with factory standard following DIN 12880 respecting the recommended wall clearances of 10 % of the height, width and depth of the inner chamber. All indications are average values, typical for units produced in series. We reserve the right to change technical specifications at any time.

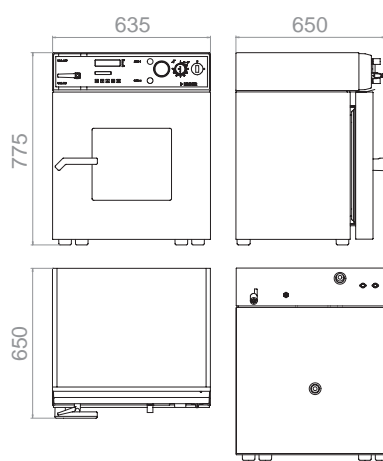


► DIMENSIONS

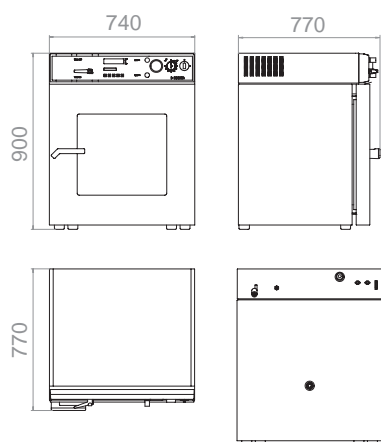
VD 23



VD 53



VD 115



► INSTALLATION REQUIREMENTS

	VD 23	VD 53	VD 115
Vacuum connection with small flange (DN mm/inch)	16 / 0.63	16 / 0.63	16 / 0.63
Measuring access port with small flange (DN mm/inch)	16 / 0.63	16 / 0.63	16 / 0.63
Inert gas connection with flow limiter (RP ¹⁾)	3 / 8	3 / 8	3 / 8

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Safety vacuum drying ovens for flammable solvents

VDL series

The safety package of the VDL series ensures maximum safety when drying organic solvents standard with TÜV/GS. The inner chamber is designed according to ATEX directive 94/9/EC for Zone EX II 3G.



► VDL 53 model



23 53 115

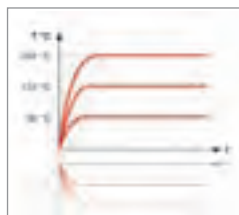
Available sizes (liters)

► EQUIPMENT

- Temperature range from 15 °C above ambient temperature to 200 °C
- MP controller with 2 programs with 10 sections each or switchable to one program with 20 segments
- Digital temperature setting with an accuracy of one degree
- Spring-mounted safety glass panel with shatter protection
- Pressure control device for heating activated < 125 mbar
- Over pressure capsuled instrument panel with compressed air connection and maintenance unit
- Flame protection gasket
- Precision-adjustable ventilation valve
- Precision-adjustable inert gas valve with Cross-Flow Technology
- Analog pressure gauge (displays pressure difference between the inner chamber and ambient pressure)
- Electro polished inner chamber, suction and ventilation tubes, pressure container, expansion racks and ball valve are made of highly corrosion resistant stainless steel V4A (1.4571)
- Door gasket made of tempered silicone
- Independent adjustable temperature safety device class 2 (DIN 12880), with visual temperature alarm
- RS 422 interface for APT-COM™ DataControlSystem communication software
- Two patented, flexible aluminum expansion racks
- Also available as complete system with module and vacuum pump

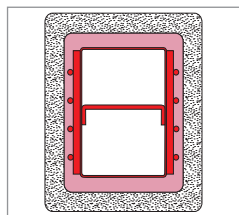


► VDL SERIES | FAST AND CONDENSATION-FREE DRYING PROCESS:



Process stability for perfect results

- Innovative control concept for regulation of the entire temperature range without overshooting
 - Short heating up times
 - Easy operation
- APT.line™ preheating chamber
 - Gentle drying throughout the chamber interior
 - Direct heat transfer through large thermal conducting plates
 - Patented, flexible positioning of the expansion racks



Accelerated drying process

- BINDER Cross-Flow Principle
- Even flow throughout the inner chamber from bottom to top
- Finely adjustable inert gas valve without turbulence for lighter samples
- Individually controlled



Standards compliant according to ATEX II 3G

- BINDER safety concept
- Explosion-protected inner chamber in accordance with EX II 3G
- Spring-mounted safety glass panel with shatter protection
- Standard inert glass connection for interior flushing
- Electronic components decoupled from the inner chamber
- Overpressure encapsulated instrument field
- Automatic heating activated < 125 mbar
- Patented flame protection gasket



Simple, time-saving cleaning

- Smooth inner chamber with rounded corners
- Inner chamber and all connections made of highly corrosion resistant stainless steel V4A (1.4571)
 - Fixtures are fully removable

► **OPTIONS**

- Expansion racks, stainless steel
- Connection kit with various small-flange components
- Measuring port for vacuum-tight access port of measuring lines into the device (9-pin)
- Temperature measurement of the specimen with flexible PT 100 sensor and digital specimen temperature display
- Calibration certificates
- Extension to calibration certificate (additional measuring points)
- Door gasket, FKM (Viton)
- Vacuum module with ATEX chemical membrane pump VP 4
- Vacuum module with ATEX chemical membrane pump VP 5
- Vacuum module for installation of vacuum pumps



BINDER one-stop solution vacuum module with pump



ATEX chemical membrane pump VP 4



► **BINDER INDIVIDUAL**
More information on page 133

Vacuum drying oven with custom-made front panel for additional protection against gas leakage

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Technical data for your planning and installation

VDL series



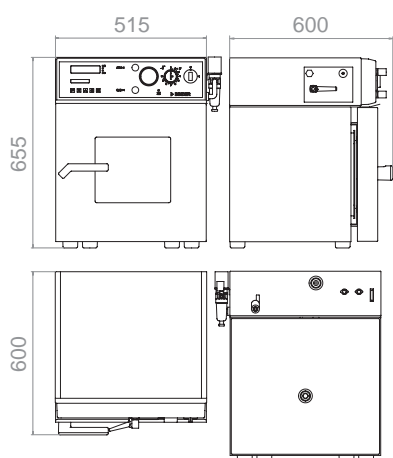
	VDL 23	VDL 53	VDL 115
Exterior dimensions			
Width VDL (mm/inch)	515 / 20.28	635 / 25.0	740 / 29.13
Height VDL (including feet) (mm/inch)	655 / 25.79	775 / 30.51	900 / 35.43
Total height VDL + option "vacuum module" (mm/inch)	1280 / 50.39	1400 / 55.12	1525 / 60.04
Depth incl. door handle, connection (mm/inch)	600 / 23.62	650 / 25.59	770 / 30.31
Interior dimensions			
Width (mm/inch)	285 / 11.22	400 / 15.75	506 / 19.92
Height (mm/inch)	285 / 11.22	400 / 15.75	506 / 19.92
Depth (mm/inch)	295 / 11.61	340 / 13.39	460 / 18.11
Interior volume (l/cu.ft.)	23 / 0.81	53 / 1.87	115 / 4.06
Quantity of expansion racks (aluminum) (standard/max.)	2 / 4	2 / 5	2 / 6
Load per rack (kg/lbs.)	20 / 44	20 / 44	20 / 44
Permitted total load (kg/lbs.)	35 / 77	45 / 99	65 / 143
Weight of the unit (empty) (kg/lbs.)	63 / 139	95 / 210	153 / 338
Temperature data			
Temperature range, 15 °C/27 °F above ambient up to °C/°F	200 / 392	200 / 392	200 / 392
Temperature uniformity ¹⁾ at 100 °C/212 °F (±K)	1.5	2	3.5
Temperature fluctuation ¹⁾ (±K)	0.1	0.1	0.1
Heating up time ¹⁾²⁾ to 100 °C (min.) Position POWER	65	80	95
Permitted end vacuum (mbar/inchHg)	0.01 / 0.000295	0.01 / 0.000295	0.01 / 0.000295
Leak rate (mbar/h / inchHg/h)	10 / 0.295	10 / 0.295	10 / 0.295
Compressed air connection for pressure-encapsulation (Ø mm)	8	8	8
Electrical data			
Housing protection acc. to EN 60529	IP 54	IP 54	IP 54
Nominal voltage (±10 %) 50/60 Hz (V)	230	230	230
Nominal power (kW)	0.8	1.2	1.9
Energy consumption at 100 °C (Wh/h)	105	150	250
Model no.			
	9030-0038	9030-0039	9030-0040

¹⁾ values measured with aluminum racks // ²⁾ up to 98 % of the set-point value /// All technical data are specified for units with standard equipment at an ambient temperature of +25 °C and a voltage fluctuation of ±10 %. The temperature data are determined in accordance to factory standard following DIN 12880 respecting the recommended wall clearances of 10 % of the height, width and depth of the inner chamber. All indications are average values, typical for units produced in series. We reserve the right to change technical specifications at any time.

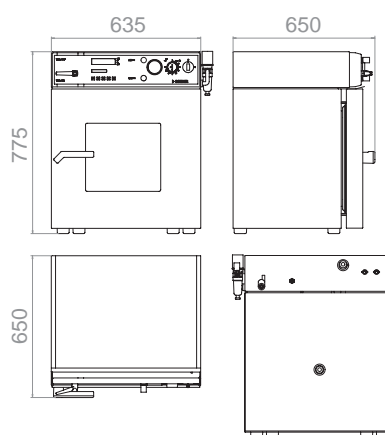


► DIMENSIONS

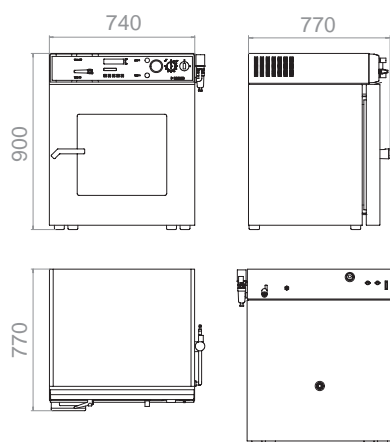
VDL 23



VDL 53



VDL 115



► INSTALLATION REQUIREMENTS

	VDL 23	VDL 53	VDL 115
Vacuum connection with small flange (DN mm/inch)	16 / 0.63	16 / 0.63	16 / 0.63
Measuring access port with small flange (DN mm/inch)	16 / 0.63	16 / 0.63	16 / 0.63
Inert gas connection with flow limiter (RP")	3 / 8	3 / 8	3 / 8

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Vacuum module with pump

VD series



For the VD series, you get an optional separate vacuum module for an ergonomic working height and to reduce noise.

The associated chemical membrane pump is available in three different designs - depending on individual needs. The speed-controlled vacuum pump VP 3.1, for example, adapts to the relevant process cycle and offers up to 30 % time savings.

Additional benefits:

- ▶ Excellent pumping speed even at low pressure
- ▶ Long lifespan due to its oil-free operation
- ▶ Special fluoroplastics provide high chemical resistance



Vacuum module with integrated chemical membrane pump	Vacuum module with chemical membrane pump	Vacuum module with chemical membrane pump	Vacuum module with speed-controlled chemical membrane pump
Type	VP 1.1	VP 2.1	VP 3.1
Nominal airflow	2.0 m ³ /h	3.4 m ³ /h	4.6 m ³ /h
Final pressure	7 mbar	1.5 mbar	1.5 mbar
Electrical connection (50 – 60 Hz)	230 V / 115 V	230 V / 115 V	230 V / 115 V
VD 23 series	•	•	•
VD 53 series	•	•	•
VD 115 series	•	•	•

Vacuum module with pump

VDL series



In the vacuum module of the VDL series, there are two different chemical membrane pumps to choose from with different suction capacity and final pressure. Both models are ATEX approved and distinguish themselves by the pressure-capsulated motor with integrated, self-locking overload and overheating protection.

In potentially explosive areas, only ATEX-compliant operating materials may be used since July 1, 2003. All BINDER vacuum pumps for the VDL series are ATEX-compliant.



Vacuum module with integrated chemical membrane pump	Vacuum module with chemical membrane pump, explosion protected	Vacuum module with chemical membrane pump, explosion protected
Typ	VP 4	VP 5
ATEX approval according to ATEX 94/9/EC	yes	yes
Nominal airflow	1.9 m³/h	3.7 m³/h
Final pressure	12 mbar	3 mbar
Electrical connection (50 Hz)	230 V	230 V
VDL 23 series	•	–
VDL 53 series	•	–
VDL 115 series	•	•
Application profile	Approved ATEX-compliant Membrane pump for VDL 23 VDL 53 series	Approved ATEX-compliant Membrane pump with low final vacuum for VDL 115 series

- Option
- not available

We reserve the right to alter technical specifications at any time.

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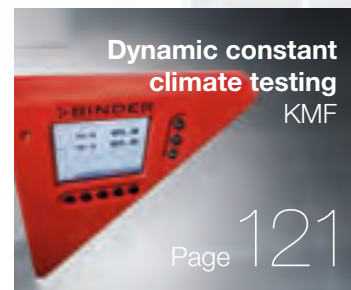
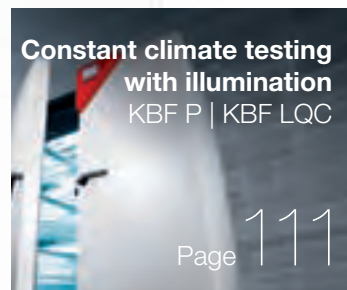
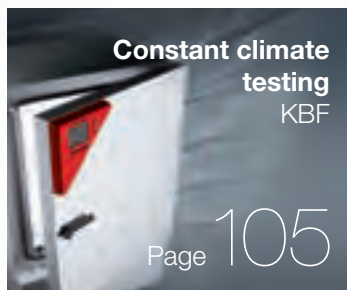


Environmental simulation

| Always the right climate

Research and quality assurance is solely focused on the optimization and monitoring of the performance standards, of functions and service life of materials, products and systems. It is expected from a climate chamber that it simulates the effects of temperature, humidity and light on the chemical, physical and biological behavior of the test material in a reproducible manner.

BINDER offers a range of 10 series of constant climate chambers specifically designed for these demanding requirements. They provide innovative technical solutions and comprehensive equipment options, with which specimens can be safely and reliably tested, whether actively or passively. For special technical requirements, users can also rely on the individually tailored solutions from BINDER INDIVIDUAL.





Constant climate testing

KBF series

Proven superior: Constant climate chambers

- ▶ Proven precision
 - ▶ Double-sided horizontal air flow for maximum parameter uniformity
 - ▶ Automatic water and wastewater management
 - ▶ Responsive vapor pressure humidification
 - ▶ Powerful cooling system for safe operation up to 32 °C ambient temperature
 - ▶ Stability tests according to ICH guideline Q1A(R2)

- ▶ Proven documentation
 - ▶ Documentation in support of GMP/GLP compliance
 - ▶ FDA-compliant software APT-COM™
 - ▶ IQ, OQ, PQ validation documentation

The long-term constant temperature and humidity values of BINDER constant climate chambers are impressive. The KBF series is ideal for norm-compliant work according to ICH guidelines. As an inexpensive alternative to using multiple types of climate chambers, the BINDER constant climate chambers can be used for a number of applications.



Basic research



Pharmaceutical industry



Cosmetic industry

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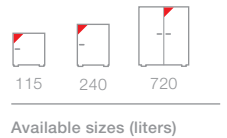
Constant climate chambers

KBF Series

The KBF is the specialist for reliable stability testing and precise maintenance of constant climatic conditions. From programming to documentation, it meets all important guidelines such as ICH, FDA, GMP and GLP. With its high capacity reserves, automatic water and wastewater management and many options, the BINDER KBF is well prepared for the future.



► KBF 240 model



► EQUIPMENT

- Temperature range from 0 °C to 70 °C (without humidity)
- Humidity range: 10 % to 80 % r. H.
- MCS controller which can store 25 programs of 100 sections each for a maximum of 500 program segments
- User-friendly LCD color screen
- Easy-to-read menu guidance
- Integrated electronic chart recorder
- Variety of options for the graphic display of process parameters
- Real-time clock
- Electronically controlled humidification and dehumidification system with capacitive humidity sensor
- Suitable for stability tests according to ICH guideline Q1A(R2)
- Inner glass door with seal
- Independent temperature safety device class 3.1 (DIN 12880) with visual and audible alarm
- Access port with silicone plug Ø 30 mm, left side
- Complete safety connection kit for water supply and drainage, up to 1 m high
- Ethernet interface for communication software APT-COM™ DataControlSystem
- Two shelves, stainless steel



► **KBF SERIES | BEST TEST RESULTS:**



Precise climate conditions

- APT.line™ preheating chamber
 - Constant and gentle circulation of air through large-surface side walls even under a full load
 - Homogeneous climate conditions throughout test specimens



Flexible water management

- Sewage pump for discharges up to 1 m high
- Solutions independent of installation sight
- Water treatment with BINDER PURE AQUA SERVICE
- External water supply



Fast and precise humidification

- Vapor pressure humidification with fast response times
- Drift-free, capacitive humidity sensor
- Short recovery times after door opening
- Finely adjustable humidity control



Comprehensive additional services

- Data Logger Kits
- Years of experience with recognized validation materials and documents
- Customer-specific modifications



Norm-compliant work

- Meets all ICH-relevant requirements in accordance with ICH Q1A(R2)
- Documentation and software FDA compliant

► **OPTIONS**

- Access ports of various diameters with silicone plug
- Shelves, stainless steel
- Perforated shelf, stainless steel
- Reinforced rack, stainless steel
- Lockable controller keyboard
- Interior lighting
- Waterproof interior socket 230 V AC
- Additional PT 100 temperature sensor
- RS 422 interface
- External water supply set
- BINDER PURE AQUA SERVICE
- Calibration certificate and extension to calibration certificate
- Measurement of temperature accuracy according to DIN 12880
- Data Logger Kit and software
- Independent temperature safety device class 3.3 (DIN 12880)
- Analog outputs 4 – 20 mA for temperature and humidity measurements
- Isolated alarm outputs for temperature and humidity
- Door lock



Data Logger Kits



BINDER PURE AQUA SERVICE water treatment system



External water supply



Climate chamber with full-view glass door and manual access ports

► **BINDER INDIVIDUAL**
More information on page 133

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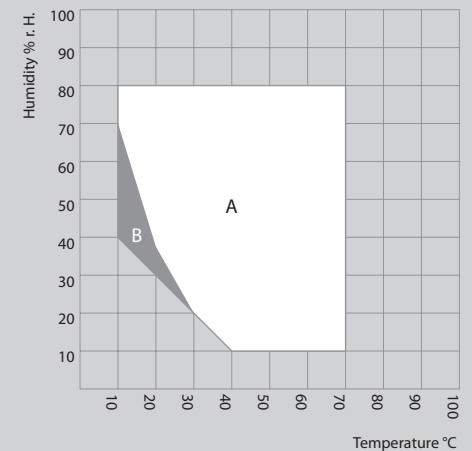
Technical data for your planning and installation

KBF series



	KBF 115	KBF 240	KBF 720
Exterior dimensions			
Width (mm/inch)	885 / 34.84	930 / 36.61	1255 / 49.41
Height (including feet/casters) (mm/inch)	1050 / 41.34	1460 / 57.48	1925 / 75.79
Depth (mm/inch)	650 / 25.59	800 / 31.50	890 / 35.04
including door handle, l-triangle, connection (mm/inch)	730 / 28.74	880 / 34.65	970 / 38.19
Quantity of doors / Quantity of inner glass doors	1 / 1	1 / 1	2 / 2
Interior dimensions			
Width (mm/inch)	600 / 23.62	650 / 25.59	973 / 38.31
Height (mm/inch)	483 / 19.02	785 / 30.91	1250 / 49.21
Depth (mm/inch)	351 / 13.82	485 / 19.09	576 / 22.68
Interior volume (l/cu.ft.)	102 / 3.60	247 / 8.73	700 / 24.73
Quantity of racks (standard/max.)	2 / 5	2 / 9	2 / 15
Load per rack (kg/lbs.)	30 / 66	30 / 66	45 / 99
Permitted total load (kg/lbs.)	100 / 221	100 / 221	150 / 331
Weight (empty) (kg/lbs.)	129 / 285	184 / 406	309 / 682
Temperature data			
Temperature range ¹⁾ (°C/°F)	0 – 70 / 32 – 158	0 – 70 / 32 – 158	0 – 70 / 32 – 158
Temperature uniformity at 25 °C / 77 °F (±K)	0.2	0.2	0.2
Temperature fluctuation (±K)	0.1	0.1	0.1
Max. heat compensation up to 40 °C / 104 °F (W)	200	300	600
Climatic data			
Temperature range ¹⁾ (°C/°F)	10 – 70 / 50 – 158	10 – 70 / 50 – 158	10 – 70 / 50 – 158
Temperature uniformity at 25 °C / 77 °F and 60 % r. H. (±K)	0.2	0.3	0.2
Temperature fluctuation at 25 °C / 77 °F and 60 % r. H. (±K)	0.1	0.1	0.1
Humidity range (% r. H.)	10 – 80	10 – 80	10 – 80
Humidity fluctuation at 25 °C / 77 °F and 60 % r. H. (±% r. H.)	≤ 2	1.5	1.5
Recovery time after doors were open for 30 sec ²⁾ at 25 °C / 77 °F and 60 % r. H.	15	4	2
Electrical data			
Housing protection acc. to EN 60529	IP 20	IP 20	IP 20
Nominal voltage (±10 %) 50/60 Hz (V)	200 – 240 1N~	200 – 240 1N~	200 – 240 1N~
Nominal power at 240 V (kW)	2.0	2.1	3.1
Energy consumption ³⁾ at 40 °C / 104 °F / 75 % r. H. (Wh/h)	470	650	620
Model no.	9020-0139	9020-0150	9020-0108

▶ TEMPERATURE-HUMIDITY CHART

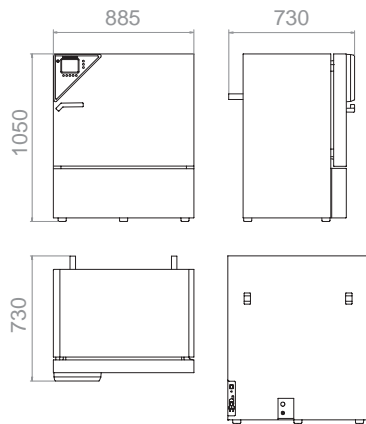


A: Guaranteed condensation-free range
B: Time-limited operation (max. 24 hours)

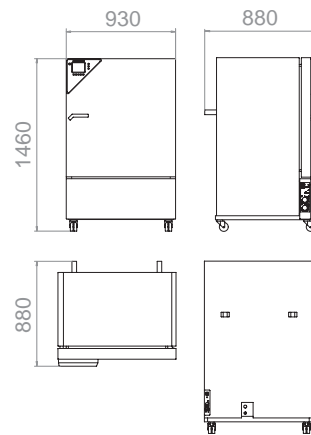


► DIMENSIONS

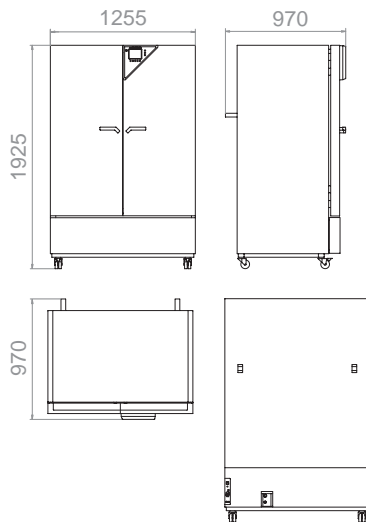
KBF 115



KBF 240



KBF 720



► INSTALLATION REQUIREMENTS

	KBF 115	KBF 240	KBF 720
Nominal voltage ($\pm 10\%$) 50/60 Hz (V)	200 – 240 1N~	200 – 240 1N~	200 – 240 1N~
Nominal power at 240 V (kW)	2.0	2.1	3.1

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Constant climate testing with illumination

KBF P | KBF LQC series

Consistently better: Constant climate chambers with illumination

- ▶ Consistently better with illumination
 - ▶ Compliance with ICH guideline Q1B, Option 2.
 - ▶ Height-adjustable illumination cassettes
 - ▶ Homogeneous light distribution with the patented Synergy Light™
- ▶ Consistently better with Light Quantum Control
 - ▶ Spherical ball-type sensors for omnidirectional measurement of light intensity
 - ▶ Accurate light valuation directly at the sample location
 - ▶ Automatic shutdown of the light source upon reaching the programmed light dosage

BINDER's constant climate chambers with ICH-compliant illumination provide impressive long-term constant climate and illumination values. With the patented Light Quantum Control (LQC), they offer complete reliable solution for photostability testing in one chamber.



Pharmaceutical industry



Food / Beverage

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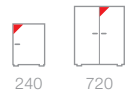
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Constant climate chambers with ICH-compliant illumination KBF P series

Our expert for photostability testing. In terms of standards compliance, performance and functionality, the KBF P is a true KBF and is also equipped with ICH-compliant illumination. This provides clear and meaningful test results according to ICH guideline Q1B, Option 2. The variable position illumination cassettes with the unique BINDER Q1B Synergy Light™ ensure homogeneous lighting conditions over the entire usable area.



► KBF P 720 model



240

720

Available sizes (liters)

► EQUIPMENT

- Temperature range 0 °C to 70 °C (without illumination and humidity)
- Temperature range 10 °C/20 °C with 60 °C (with illumination and humidity)
- Humidity range 10 % to 75% r. H. (with illumination)
- Humidity range 10 % to 80% r. H. (without illumination)
- Variable position illumination cassettes with BINDER Q1B Synergy Light™
- MCS controller which can store 25 programs of 100 sections each for a maximum of 500 program segments
- User-friendly LCD color screen
- Easy-to-read menu guide
- Integrated electronic chart recorder
- Variety of options for the graphic display of process parameters
- Real-time clock
- Electronically controlled humidification and dehumidification system with capacitive humidity sensor
- Suitable for stability tests according to ICH guideline Q1A(R2) and Q1B Option 2
- Inner glass door with seal
- Independent temperature safety device class 3.1 (DIN 12880) with visual and audible alarm
- Access port with silicone plug Ø 30 mm, left side
- Complete safety connection kit for water supply and drainage, up to 1 m high
- Ethernet interface for communication software APT-COM™ DataControlSystem
- Shelves, stainless steel



► **KBF P SERIES | BEST TEST RESULTS:**



Homogeneous light distribution

- Unique lighting concept
 - ICH-Q1 B Option 2 compliant light spectrum with BINDER Synergy Light™
 - Variable position and removable illumination cassettes
 - Homogeneous light over the entire usable space



Flexible water management

- Sewage pump for discharges up to 1m in height
- Solutions independent of installation sight
- Water treatment with BINDER PURE AQUA SERVICE
- External water supply



Precise climate conditions

- BINDER APT.line™ preheating chamber
 - Constant and gentle circulation of air through large-surface side walls even under a full load
 - Homogeneous climate conditions throughout test specimens



Norm-compliant work

- Meets all ICH-relevant requirements in accordance with ICH Q1A(R2), ICH Q1B, Option 2
- Documentation and software ensure FDA and GMP/GLP compliance



Fast and precise humidification

- Vapor pressure humidification with fast response times
- Drift-free, capacitive humidity sensor
- Short recovery times after door opening
- Finely adjustable humidity control

► **OPTIONS**

- Access ports of various diameters with silicone plug
- Shelves, stainless steel
- Perforated shelf, stainless steel
- Reinforced rack, stainless steel
- Lockable controller keyboard
- Additional PT 100 temperature sensor
- RS 422 interface
- Replacement fluorescent tube set for one illumination cassette
- External water supply set
- BINDER PURE AQUA SERVICE
- Calibration certificate and extension to calibration certificate
- Measurement of temperature accuracy according to DIN 12880
- Data Logger Kit and software
- Independent temperature safety device class 3.3 (DIN 12880)
- Analog outputs 4 – 20 mA for temperature and humidity measurements
- Isolated alarm outputs for temperature and humidity
- Door lock



APT-COM™ DataControlSystem
GLP Edition



Data Logger Kits



BINDER PURE AQUA SERVICE
water treatment system



Climate chamber with dimmable
illumination cassettes

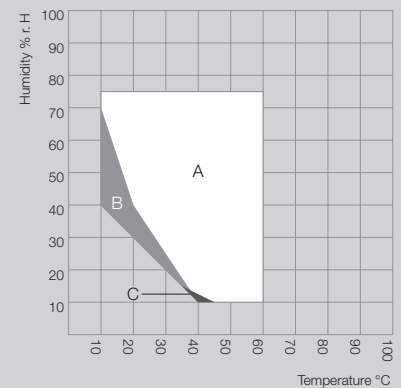
► **BINDER
INDIVIDUAL**
More information
on page 133

Technical data for your planning and installation KBF P series

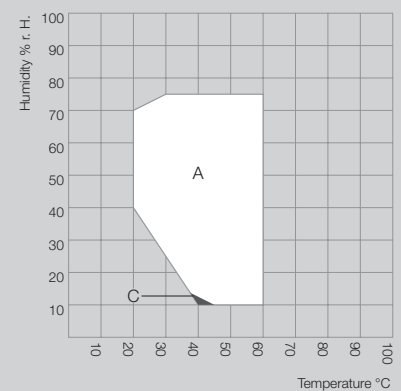


	KBF P 240	KBF P 720
Exterior dimensions		
Width	930 / 36.61	1255 / 49.41
Height (including feet/castors) (mm/inch)	1460 / 57.48	1925 / 75.79
Depth (mm/inch) including door handle, I-triangle, connection (mm/inch)	880 / 34.65	970 / 38.19
Interior dimensions		
Width / Height / Depth (mm)	650 / 785 / 485	973 / 1250 / 576
Width / Height / Depth (inch)	25.59 / 30.91 / 19.09	38.31 / 49.21 / 22.68
Interior volume (l/cu.ft.)	247 / 8.73	700 / 24.73
Number of light cassettes	2	3
Number of racks (standard/max.)	2 / 9	3 / 12
Weight (empty) (kg/lbs.)	213 / 470	374 / 826
Temperature data		
Temperature range ¹⁾ (°C/°F)	0 – 70 / 32 – 158	0 – 70 / 32 – 158
Temperature range without light cassettes ¹⁾ (°C/°F)	0 – 70 / 32 – 158	0 – 70 / 32 – 158
Temperature range with light cassettes, with illumination ¹⁾ (°C/°F)	10 – 60 / 50 – 140	10 – 60 / 50 – 140
Temperature uniformity at 25 °C / 77 °F (±K)	0.2	0.2
Temperature fluctuation (±K)	0.1	0.1
Max. heat compensation up to 40 °C / 104 °F (W)	400	1000
Climatic data		
Temperature range with light cassettes, with illumination ¹⁾ (°C/°F)	10 – 60 / 50 – 140	20 – 60 / 68 – 140
Temperature uniformity with illumination at 25 °C / 77 °F and 60 % r. H. (±K)	0.6	1.2
Temperature fluctuation with illumination at 25 °C / 77 °F and 60 % r. H. (±K)	0.2	0.2
Humidity range with light cassettes, with illumination ¹⁾ (% r. H.)	10 – 75	10 – 75
Humidity fluctuation at 25 °C / 77 °F and 60 % r. H. with illumination (±% r. H.)	1.5	2
Recovery time after doors were open for 30 sec ²⁾ at 25 °C / 77 °F and 60 % r. H. with illumination (min)	3	1
Illumination data per light cassette		
ICH compliant illumination for photostability testing ³⁾ (Lux / UVA W/m ²)	7500 / 1.4	9900 / 2.1
Electrical data		
Housing protection acc. to EN 60529	IP 20	IP 20
Energy consumption ⁴⁾ at 40 °C / 104 °F / 75 % r. H. (Wh/h)	600	2350
Model no.		
	9020-0160	9020-0143

► **TEMPERATURE-HUMIDITY CHART WITH ILLUMINATION KBF P 240**



► **TEMPERATURE-HUMIDITY CHART WITH ILLUMINATION KBF P 720**

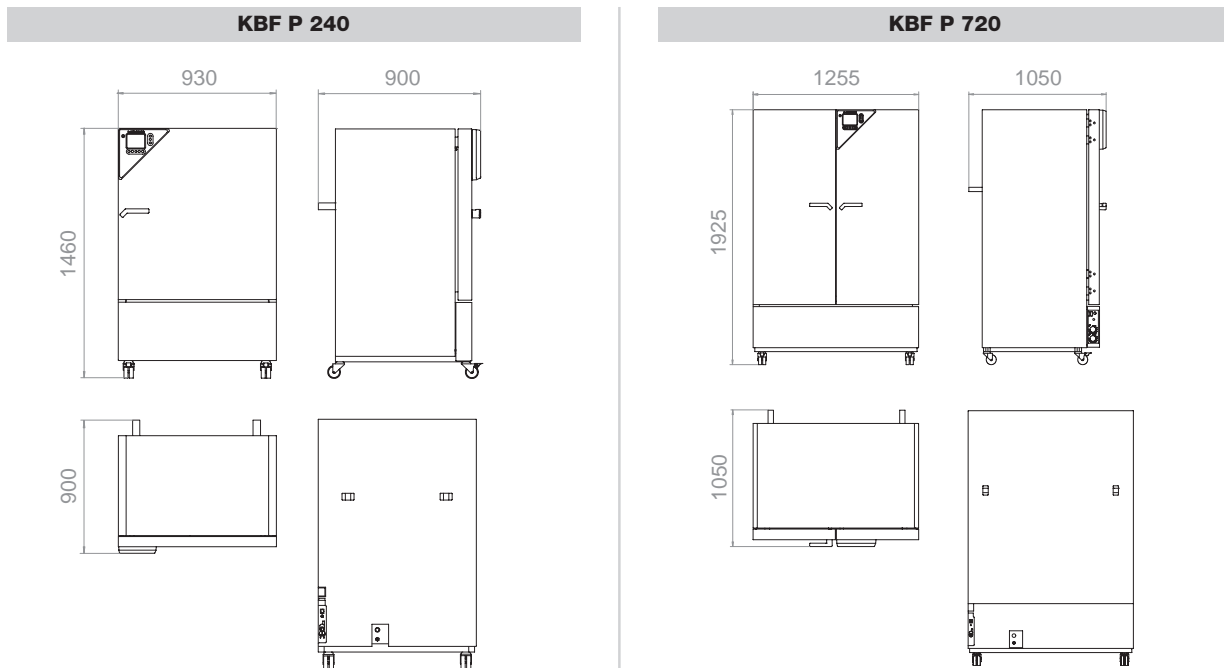


A: Guaranteed condensation-free range
B: Time-limited operation (max. 24 hours)
C: Deviations of technical data may be possible

¹⁾ Lower values are valid up to an ambient temperature of max. 25 °C / 77 °F. // ²⁾ to 98 % of the set value // ³⁾ Average value, measured with a spherical sensor (±10 %) by 12 cm / 4.7 in below the light cassette // ⁴⁾ Use this value for dimensioning air conditioning systems. /// All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a voltage fluctuation of ±10 %. The temperature data are determined in accordance with factory standard following DIN 12880 respecting the recommended wall clearances of 10 % of the height, width and depth of the inner chamber. Technical data refers to 100 % fan speed. All indications are average values, typical for units produced in series. We reserve the right to change technical specifications at any time.



► DIMENSIONS



► INSTALLATION REQUIREMENTS

	KBF P 240	KBF P 720
Wall clearance rear (mm/inch)	100 / 3.94	100 / 3.94
Wall clearance side (mm/inch)	100 / 3.94	200 / 7.87
Nominal voltage ($\pm 10\%$) 50/60 Hz (V)	200 – 240 1N~	200 – 240 1N~
Nominal power at 240 V (kW)	2.4	3.5

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Constant climate chambers with Light Quantum Control

KBF LQC series

The special advantage of the KBF LQC series is the photometry, one of our patented enhancements for photostability testing. Two spherical 3D ball-type sensors capture the visible light intensity and UV light intensity at the sample more realistically than any other systems. If the desired light dosage is achieved, the light sources switch off automatically. This convenient solution provides absolute standards compliance.



► KBF LQC 240 model



Available sizes (liters)

► EQUIPMENT

- Temperature range 0 °C to 70 °C (without illumination and humidity)
- Temperature range 10 °C/20 °C with 60 °C (with illumination and humidity)
- Humidity range 10 % to 75 % r. H. (with illumination)
- Humidity range 10 % to 80 % r. H. (without illumination)
- Light Quantum Control (LQC), realistic measurement and integration of the light intensity and the UV light intensity at the sample location
- Variable position illumination cassettes with BINDER Q1B Synergy Light™
- MCS controller which can store 25 programs of 100 sections each for a maximum of 500 program segments (User-friendly LCD color screen, easy-to-read menu guide, integrated electronic chart recorder, variety of options for the graphic display of process parameters, real-time clock)
- Electronically controlled humidification and dehumidification system with capacitive humidity sensor Suitable for stability tests according to ICH guideline Q1A(R2) and Q1B Option 2
- Inner glass door with seal
- Independent temperature safety device class 3.1 (DIN 12880) with visual and audible alarm
- Access port with silicone plug Ø 30 mm, left side
- Complete safety connection kit for water supply and drainage, up to 1 m high
- Ethernet interface for communication software APT-COM™ DataControlSystem
- Shelves, stainless steel

► **KBF LQC SERIES | BEST TEST RESULTS:**



Precise climate conditions

- BINDER APT.line™ preheating chamber
- Constant and gentle circulation of air through large-surface side walls even under a full load
- Homogeneous climate conditions throughout test specimens



Precise photometry

- LQC - Light Quantum Control
- 3D ball-type sensors capture light true light intensity, can be flexibly placed on the sample material
- Automatically switched off after required light intensity



Homogeneous light distribution

- Unique lighting concept
- ICH-Q1 B Option 2 compliant light spectrum with BINDER Synergy Light™
- Variable position and removable illumination cassettes
- Homogeneous light over the entire usable space



Flexible water management

- Sewage pump for discharges up to 1m in height
- Solutions independent of installation sight
- Water treatment with BINDER PURE AQUA SERVICE
- External water supply



Fast and precise humidification

- Vapor pressure humidification with fast response times
- Drift-free, capacitive humidity sensor
- Short recovery times after door opening
- Finely adjustable humidity control



Norm-compliant work

- Meets all ICH-relevant requirements in accordance with ICH Q1A(R2), ICH Q1B, Option 2
- Documentation and software ensure FDA and GMP/GLP compliance

► **OPTIONS**

- Access ports of various diameters with silicone plug
- Shelves, stainless steel
- Perforated shelf, stainless steel
- Reinforced rack, stainless steel
- Lockable controller keyboard
- Additional PT 100 temperature sensor
- RS 422 interface
- Replacement fluorescent tube set for one illumination cassette
- External water supply set
- BINDER PURE AQUA SERVICE
- Calibration certificate and extension to calibration certificate
- Measurement of temperature accuracy according to DIN 12880
- Data Logger Kit and software
- Independent temperature safety device class 3.3 (DIN 12880)
- Analog outputs 4 – 20 mA for temperature and humidity measurements
- Isolated alarm outputs for temperature and humidity
- Door lock



Data Logger Kits



Validations and calibrations



External water supply set



Climate chamber with various access ports

► **BINDER
INDIVIDUAL**
More information
on page 133

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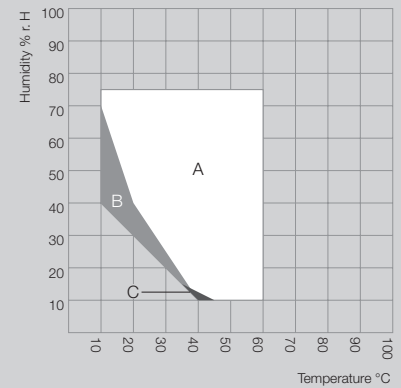
Technical data for your planning and installation

KBF LQC series

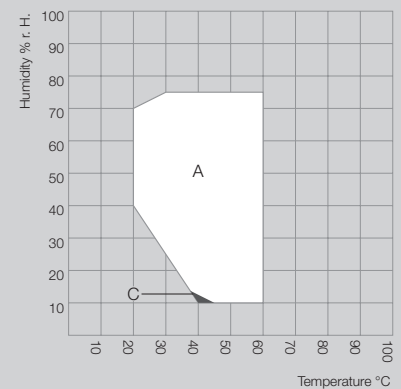


	KBF LQC 240	KBF LQC 720
Exterior dimensions		
Width	930 / 36.61	1255 / 49.41
Height (including feet/casters) (mm/inch)	1460 / 57.48	1925 / 75.79
Depth (mm/inch) including door handle, I-triangle, connection (mm/inch)	880 / 34.65	970 / 38.19
Interior dimensions		
Width / Height / Depth (mm)	650 / 785 / 485	973 / 1250 / 576
Width / Height / Depth (inch)	25.59 / 30.91 / 19.09	38.31 / 49.21 / 22.68
Interior volume (l/cu.ft.)	247 / 8.73	700 / 24.73
Number of light cassettes	2	3
Number of racks (standard/max.)	2 / 9	3 / 12
Weight (empty) (kg/lbs.)	213 / 470	374 / 826
Temperature data		
Temperature range ¹⁾ (°C/°F)	0 – 70 / 32 – 158	0 – 70 / 32 – 158
Temperature range without light cassettes ¹⁾ (°C/°F)	0 – 70 / 32 – 158	0 – 70 / 32 – 158
Temperature range with light cassettes, with illumination ¹⁾ (°C/°F)	10 – 60 / 50 – 140	10 – 60 / 50 – 140
Temperature uniformity at 25 °C / 77 °F (±K)	0.2	0.2
Temperature fluctuation (±K)	0.1	0.1
Max. heat compensation up to 40 °C / 104 °F (W)	400	1000
Climatic data		
Temperature range with light cassettes, with illumination ¹⁾ (°C/°F)	10 – 60 / 50 – 140	20 – 60 / 68 – 140
Temperature uniformity with illumination at 25 °C / 77 °F and 60 % r. H. (±K)	0.6	1.2
Temperature fluctuation with illumination at 25 °C / 77 °F and 60 % r. H. (±K)	0.2	0.2
Humidity range with light cassettes, with illumination ¹⁾ (% r. H.)	10 – 75	10 – 75
Humidity fluctuation at 25 °C / 77 °F and 60 % r. H. with illumination (±% r. H.)	1.5	2
Recovery time after doors were open for 30 sec ²⁾ at 25 °C / 77 °F and 60 % r. H. with illumination (min)	3	1
Illumination data per light cassette		
ICH compliant illumination for photostability testing ³⁾ (Lux / UVA W/m ²)	7500 / 1.4	9900 / 2.1
Electrical data		
Housing protection acc. to EN 60529	IP 20	IP 20
Nominal voltage (±10 %) 50/60 Hz (V) / Nominal power at 240 V (kW)	200 – 240 1N~ / 2.4	200 – 240 1N~ / 3.5
Energy consumption ⁴⁾ at 40 °C / 104 °F / 75 % r. H. (Wh/h)	600	2350
Model no.	9020-0177	9020-0171

► TEMPERATURE-HUMIDITY CHART WITH ILLUMINATION KBF LQC 240



► TEMPERATURE-HUMIDITY CHART WITH ILLUMINATION KBF LQC 720

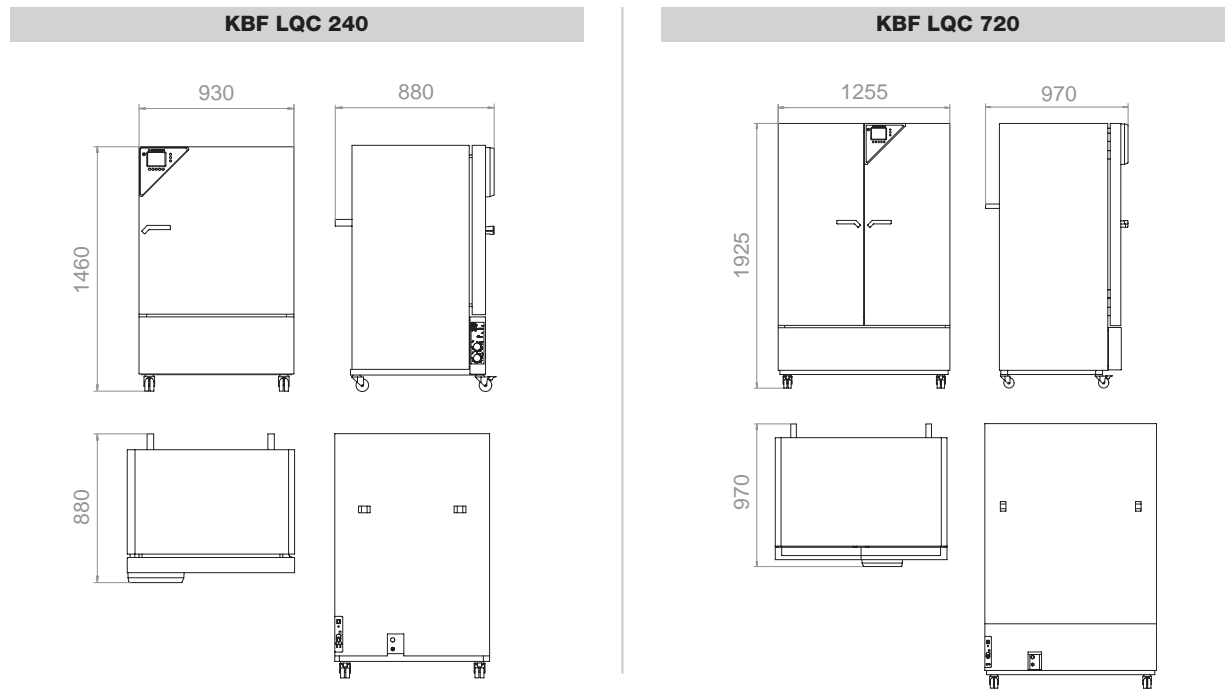


A: Guaranteed condensation-free range
B: Time-limited operation (max. 24 hours)
C: Deviations of technical data may be possible

¹⁾ Lower values are valid up to an ambient temperature of max. 25 °C / 77 °F. // ²⁾ to 98 % of the set value // ³⁾ Average value, measured with a spherical sensor (±10 %) by 12 cm / 4.7 in below the light cassette // ⁴⁾ Use this value for dimensioning air conditioning systems. /// All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a voltage fluctuation of ±10 %. The temperature data are determined in accordance with factory standard following DIN 12880 respecting the recommended wall clearances of 10 % of the height, width and depth of the inner chamber. Technical data refers to 100 % fan speed. All indications are average values, typical for units produced in series. We reserve the right to change technical specifications at any time.



► DIMENSIONS



► INSTALLATION REQUIREMENTS

	KBF LQC 240	KBF LQC 720
Wall clearance rear (mm/inch)	100 / 3.94	100 / 3.94
Wall clearance side (mm/inch)	100 / 3.94	200 / 7.87
Nominal voltage ($\pm 10\%$) 50/60 Hz (V)	200 – 240 1N~	200 – 240 1N~
Nominal power at 240 V (kW)	2.4	3.5

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BINDER



LOGGED: 2010-11-11
M

TEMP	85.0	85.0
HUMID	85.0	85.0

LOGGED OFF

EXIT
O
ENTER

Five small black circular buttons arranged horizontally.



Dynamic constant climate testing

KMF series

More options: Dynamic constant climate chambers

- ▶ More flexibility
 - ▶ Extended temperature range from -10 °C to 100 °C
 - ▶ Broader climate range up to 90 % r. H.
 - ▶ Defined temperature change rates
 - ▶ Automatic water and wastewater management
- ▶ More reliability
 - ▶ Responsive vapor pressure humidification
 - ▶ Powerful cooling system for safe operation up to 32 °C ambient temperature
 - ▶ Long-term stress testing, e. g. at 85 °C / 85 % r. H.

The dynamic constant climate chambers from BINDER ensure absolutely constant test conditions throughout the testing area. Their greatest advantage is the low space requirement and flexibility regarding the water supply. The wide temperature and humidity ranges make them ideally suited for stress testing series.



Automotive



Plastics industry



Packaging industry

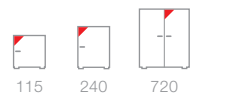
Constant climate chambers for stress testing

KMF series

The KMF is the specialist for unconditionally reliable stress testing and precise maintenance of constant test conditions. It has particularly large power reserves and an extremely broad climate range: from -10 °C to 100 °C. It works condensation-free up to 90% r. H. These features make the KMF unique in its class.



► KMF 240 model



115 240 720

Available sizes (liters)

► EQUIPMENT

- Temperature range from -10 °C to 100 °C
- Humidity range 10 % to 90 % r. H.
- MCS controller which can store 25 programs of 100 sections each for a maximum of 500 program segments
- User-friendly LCD color screen
- Easy-to-read menu guide
- Integrated electronic chart recorder
- Variety of options for the graphic display of process parameters
- Real-time clock
- Electronically controlled humidification and dehumidification system with capacitive humidity sensor
- Inner glass door
- Independent temperature safety device class 3.1 (DIN 12880) with visual and audible alarm
- Access port with silicone plug Ø 30 mm, left side
- Complete safety connection kit for water supply and drainage, up to 1m in height
- Ethernet interface for communication software APT-COM™ DataControlSystem
- Shelf, stainless steel
- Four casters, two with brakes (KMF 240/720)



► **KMF SERIES | BEST TEST CONDITIONS:**



Precise climate conditions

- BINDER APT.line™ preheating chamber
 - Constant and gentle circulation of air through large-surface side walls even under a full load
 - Homogeneous climate conditions throughout test specimens



Flexible water management

- Sewage pump for discharges up to 1m in height
- Solutions independent of installation sight
- Water treatment with BINDER PURE AQUA SERVICE
- External water supply



Fast and precise humidification

- Vapor pressure humidification with fast response times
- Drift-free, capacitive humidity sensor
- Short recovery times after door opening
- Finely adjustable humidity control



Comprehensive additional services

- Data Logger Kits
- Years of proven validation and documentation materials
- Customer-specific modifications



Convenient assembly and operation

- Large access area
- Control elements accessible from the front
- Optimal ratio of usable space and footprint

► **OPTIONS**

- Access ports of various diameters with silicone plug
- Shelf, stainless steel
- Perforated shelf, stainless steel
- Reinforced rack, stainless steel
- Lockable controller keyboard
- Interior lighting
- Additional PT 100 temperature sensor
- RS 422 interface
- External water supply set
- BINDER PURE AQUA SERVICE
- Calibration certificate and extension to calibration certificate
- Measurement of temperature accuracy according to DIN 12880
- Data Logger Kit and software
- Independent temperature safety device class 3.3 (DIN 12880)
- Analog outputs 4 – 20 mA for temperature and humidity measurements
- Door lock



BINDER PURE AQUA SERVICE



Data Logger Kits



Numerous access ports



Climate chamber with windows, doors and access ports for connecting several measuring instruments

► **BINDER INDIVIDUAL**
More information on page 133

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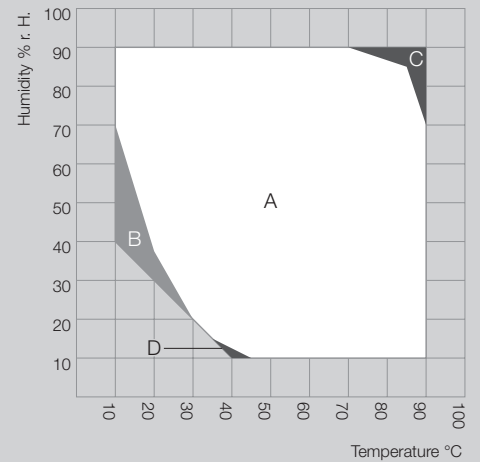
Technical data for your planning and installation

KMF series



	KMF 115	KMF 240	KMF 720
Exterior dimensions			
Width (including access port) (mm/inch)	885 / 34.84	930 / 36.61	1255 / 49.41
Height (including feet/casters) (mm/inch)	1050 / 41.34	1460 / 57.48	1925 / 75.79
Depth (mm/inch)	650 / 25.59	800 / 31.50	890 / 35.04
Depth including door handle, I-triangle, connection, cable (mm/inch)	730 / 28.74	880 / 34.65	970 / 38.19
Interior dimensions			
Width (mm/inch)	600 / 23.62	650 / 25.59	973 / 38.31
Height (mm/inch)	483 / 19.02	785 / 30.91	1250 / 49.21
Depth (mm/inch)	351 / 13.82	485 / 19.09	576 / 22.68
Interior volume (l/cu.ft.)	102 / 3.6	247 / 8.6	700 / 24.6
Number of racks (standard/max.)	1 / 5	1 / 9	1 / 15
Load per rack (kg/lbs.)	30 / 66	30 / 66	45 / 99
Permitted total load (kg/lbs.)	100 / 221	100 / 221	150 / 331
Weight (empty) (kg/lbs.)	127 / 280	185 / 408	309 / 682
Temperature data			
Temperature range ¹⁾ (°C/°F)	-10 – 100 / 14 – 212	-10 – 100 / 14 – 212	-10 – 100 / 14 – 212
Average heating up time acc. to IEC 60068-3-5 (K/min.)	1.3	1.1	1.0
Average cooling down time acc. to IEC 60068-3-5 (K/min.)	0.5	0.6	0.4
Max. heat compensation up to 25 °C / 77 °F (W)	150	350	400
Climatic data			
Temperature range ¹⁾ (°C/°F)	+10 – +90 / 50 – 194	+10 – +90 / 50 – 194	+10 – +90 / 50 – 194
Temperature uniformity ³⁾ (±K)	0.3 – 1.0	0.3 – 1.5	0.2 – 1.0
Temperature fluctuation ³⁾ (±K)	0.1 – 0.2	0.1 – 0.5	0.1 – 0.5
Humidity range (% r. H.)	10 – 90	10 – 90	10 – 90
Humidity fluctuation ³⁾ (± % r. H.)	≤ 2.5	≤ 2	≤ 2
Electrical data			
Housing protection acc. to EN 60529	IP 20	IP 20	IP 20
Nominal voltage (±10 %) 50/60 Hz (V)	200 – 240 1N~	200 – 240 1N~	200 – 240 1N~
Nominal power at 240 V (kW)	2.0	2.1	3.1
Energy consumption ⁴⁾ at 85 °C / 185 °F / 85 % r. H. (Wh/h)	570	500	1050
Model no.	9020-0187	9020-0145	9020-0185

► **TEMPERATURE-HUMIDITY CHART**

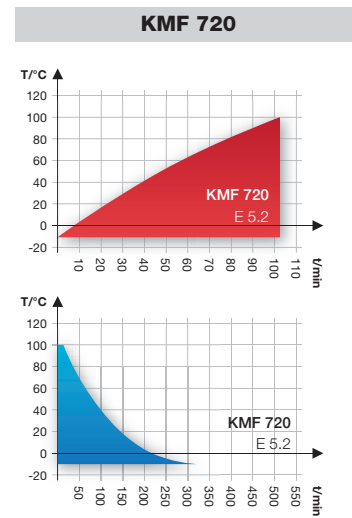
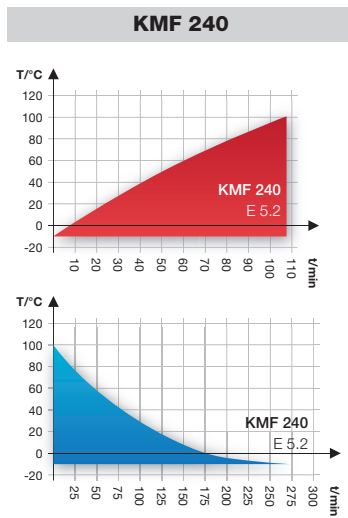
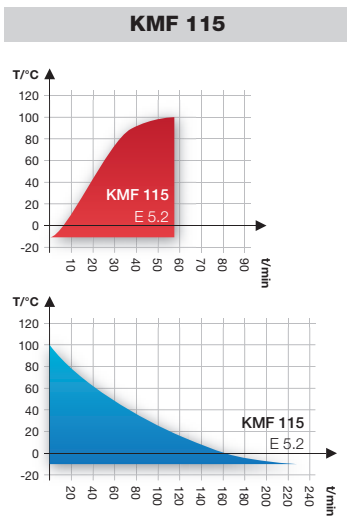


- A: Guaranteed condensation-free range
- B: Time-limited operation (max. 24 hours)
- C: Condensation in the inner chamber may be possible
- D: Deviations of technical data may be possible

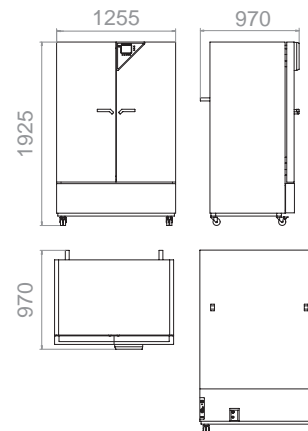
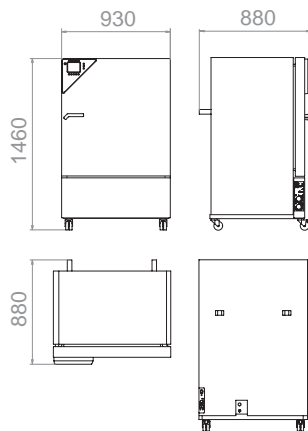
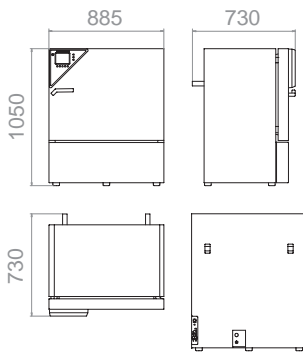
¹⁾ Lower values are valid up to an ambient temperature of max. 25 °C / 77 °F // ²⁾ to 98 % of the set value // ³⁾ depending on the set point // ⁴⁾ Use this value for dimensioning air conditioning systems. /// All technical data are specified for units with standard equipment at an ambient temperature of 25 °C and a voltage fluctuation of ±10 %. The temperature data are determined in accordance with factory standard following DIN 12880 respecting the recommended wall clearances of 10 % of the height, width and depth of the inner chamber. Technical data refers to 100 % fan speed. All indications are average values, typical for units produced in series. We reserve the right to change technical specifications at any time.



► HEATING UP AND COOLING DOWN RATE



► DIMENSIONS



► INSTALLATION REQUIREMENTS

	KMF 115	KMF 240	KMF 720
Wall clearance rear (mm/inch)	100 / 3.94	100 / 3.94	100 / 3.94
Wall clearance side (mm/inch)	100 / 3.94	100 / 3.94	100 / 3.94
Nominal voltage (±10 %) 50/60 Hz (V)	200 – 240 1N~	200 – 240 1N~	200 – 240 1N~
Nominal power at 240 V (kW)	2	2.1	3.1



Process documentation APT-COM™

| APT-COM™ DataControlSystem

Working in compliance with standards always requires excellent documentation. APT-COM™ resulted in standard software with a uniquely universal capability: Users can easily achieve process safety and data security, as well as validation of the entire system using standard features. Easy. Cutting edge.

The system, which consists of software in three different editions and the connected equipment, offers features that are needed for tasks ranging from the simplest measurements to guideline-compliant work: seamless monitoring of processes and documentation of process data. Documentation is automatically generated in electronic format and as a hard copy. This produces guideline-compliant documentation without extra effort, just like having a tailor-made suit for every PC user. Easy to use for a broad range of applications.

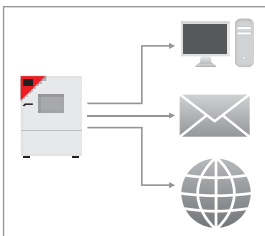
APT-COM™ DataControlSystem

► **BINDER control and documentation system**

► **Performance potential in 3 classes**

The motto here is not “as much as possible”, but rather “as much as necessary”. This has less to do with the ever-present pressure to reduce costs, and much more to do with the fact that processes today have to be as efficient as possible to achieve the best results. This includes a software system that can meet the individual requirements of a multitude of different tests and users, all while maintaining optimal adaptability. This is the reason why we developed three different comprehensive versions of the APT-COM™ software:

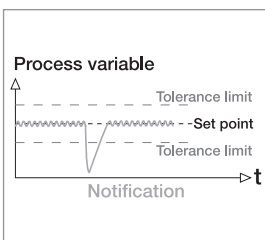
BASIC	STANDARD	GLP-Edition
permits remote adjustment of test parameters for the connected equipment, graphic interface programming, and manual documentation of your data.	links up several units within a network and provides automatic documentation if required.	For the highest demands we provide maximum functionality. Most regulatory requirements are met in this area in no time at all. Another strength of this version is remote alerts for limit violations or communication problems by means of independent monitoring and alert functions.



► **Clear presentation of process data**

Always up-to-date: Process data can be constantly accessed everywhere: either locally, by email, or through the Internet.

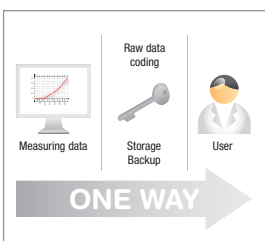
Important information always available at a glance: Making a decision on whether or not a process is running well is easy, thanks to the control console function.



► **Unsurpassed process safety and security**

Tolerance limits for each monitored parameter: No parameter can exceed the specified tolerance limits without setting off an automatic alert. The alert is sent via an intranet, the Internet, as email, or as a phone call to the person responsible.

Access restriction User IDs and passwords control access to sensitive processes. Different levels of authorization for system changes ensure proper system administration.

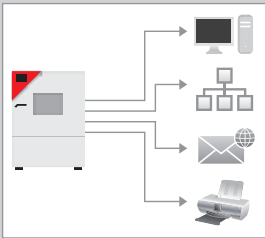


► **Guideline-compliant data security**

Storage of measured data: Protected against manipulation by an encrypted format, access restricted to the author or the administrator.

Backup of measured data: Automatic backup at user-defined time intervals for storage on all available storage media. Backed up information is easy to find thanks to automatic naming of the backup with a time-stamp.

Documentation of operator interventions: Complete documentation of any operator interventions, with user ID, time-stamp, archived protected against manipulation, and automatic backup of measured data.



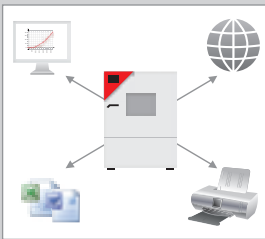
► **Time-saving documentation and presentation of results**

Generation of measured data on the monitor: Measured data is constantly regenerated from protected raw data and protected against manipulation.

Display of measured data on the internet: Users can access the process sequence with a standard browser on any PC connected to an intranet or the Internet, even without the APT-COM™ software.

Coordinated file archiving: Enables quick and easy display and printing of any past test runs.

Clear printouts: The measured data can be printed out automatically at adjustable time intervals. Form fields for comments with respect to the measurements and for authentication ensure correct data assignment and coordination. Signature fields and page numbering provide an easy way to meet documentation requirements with minimum effort.



► **Control and programming**

Remote monitoring of setpoints over great distances: Equipment isn't always within close proximity of the workstation. This is why we have provided the option of transmitting process variables to the equipment via PC and reviewing equipment settings.

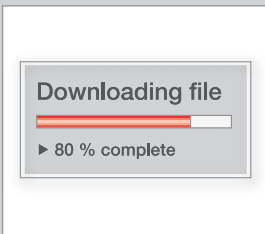
Graphic program editor: Facilitates the easy generation of extensive programs, which can be reviewed and transferred to different units. This saves time and increases transparency.



► **System qualification**

Qualification folders with records for IQ and OQ: Customized for the actual equipment and software configuration. Facilitates system validation, enjoys an excellent reputation among auditors, and saves time when implementing systems. Together with equipment qualification, it is a complete solution that takes full advantage of our experience.

System qualification: Our highly experienced BINDER service technicians supervise the proper commissioning and functionality of the system on site, and document these inspections in IQ/OQ protocols. The documentation of these important qualification steps is a comprehensive, time-saving service to ensure successful qualification.



► **Always state-of-the-art with updates**

Software updates without added costs: It goes without saying that our software is constantly being improved and updated. In addition to adding new equipment models, we also incorporate new guidelines and customer suggestions for improvements. Updates are available for free download from the BINDER website. Qualification documents are available for every version of the software.

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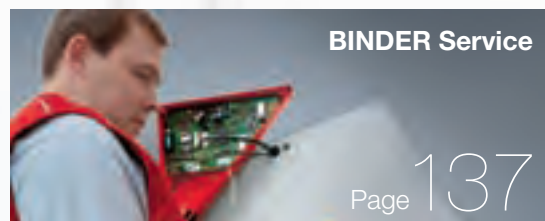
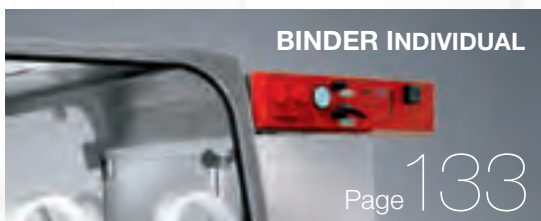


Services

| Always the right support

The professional customer in the scientific lab expects more from a chamber than just the technical features it has when it leaves the factory. In fact, the customer expects a comprehensive solution offering of competent contacts, competent consultation and above all, customer solutions that allow him to perform his daily responsibilities efficiently, effectively and successfully.

BINDER is aware of these customer requirements and, with its extensive service offering, provides the right answer to the individual requirements and expectations of the customer. This extensive market service clearly distinguishes BINDER from the competition and guarantees the additional value that the customer needs.





Reasons for BINDER INDIVIDUAL

► Know-how

BINDER INDIVIDUAL is a new name for a proven service. As a manufacturer present in many markets, sectors and applications, BINDER offers you a broad knowledge base gained through years of experience. Some examples:

- Customized optimization of heat, refrigeration, humidity, light, air, CO₂, or O₂ supply
- Customized measurement, management, control and switching
- Customized connections and outlets
- Customized design of parameters
- Customized integration of accessories (e. g. rollers)

► Reasons

Some of the reasons to discuss a customized solution with BINDER:

- To take advantage of know-how transfer through BINDER's extensive experience in a wide range of markets
- To create innovative solutions through individual technical consultation
- To implement simple and cost-effective customized solutions
- To optimize company-specific functionality
- To increase ease-of-use through customized designs
- Because an integrated solution is better than an in-house solution produced after the fact

► Service

Our technical support team is made up of application specialists, technical consultants, and engineers. This has the distinct advantage of being able to provide comprehensive services:

- Individual consultation
- Professional planning
- Full application support
- Certified calibration and validation (factory calibration certificate)
- State-of-the-art production

► Our Guarantee

All of our components complement each other since they come from a single source. All work meets the requirements of ISO 9001 standards. We also guarantee our customized solutions, and provide an operating manual that covers the additional modifications. In addition we guarantee a supply of spare parts for 10 years; all drawings and components for customized solutions have individual identification codes which are archived, in order to ensure that any spare parts for your customized application are provided correctly and promptly.

► Customized solutions



Drying oven with subdivided interior and hangers in guide rails for tubing



Integrated drying oven in a conveyor operation



Vacuum drying oven glove box



CO₂ incubator with side extension for a rotation mechanism



Safety drying oven with an ultraviolet lamp for testing UV resistance



Climatic simulation chamber with additional windows, doors and access ports to accommodate the various instrument connection leads



CO₂ incubator with integrated rotation mechanism



Vacuum drying oven with specific shelves for the placement of large numbers of very flat specimens



Climatic chamber with full-view glass door and manual access openings



Environmental simulation chamber with reinforced inner chamber and solidly mounted perforated shelves for very heavy test specimens

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