

Climatic chambers with phytotron system can control temperature, humidity and light to create a stable environment



Climatic chamber KK 500 Smart PRO FIT DS



All thermostatic equipment manufactured by POL-EKO can be provided with Calibration Certificate issued by accredited Measurement Laboratory. Detailed information on accreditation is available on website: [www.pol-eko.eu](http://www.pol-eko.eu).

Quality control must be ensured during the whole production process. Final testing process can prove that all the required technical parameters have been met. Highest quality of our products has always been our top priority. Customers are obviously very demanding, as they require state-of-the-art equipment which is so important for their research. It is our passion and devotion to deliver a product we would recommend to ourselves.



## STANDARD FEATURES

- temperature range: 0...+60°C (KK) and 0...+100°C (KKS), +10...+50°C (FIT option with light on)
- quality control protocol (at +25°C, 60%rH)
- English instruction manual
- temperature protection class 3.3 to DIN 12880
- open door alarm
- castors
- LAN and USB ports
- access port (Ø30 mm) on the left wall (at the back in FIT S/DS)
- automatic defrosting function
- deionized water container (for KK)
- door lock
- stainless steel wire shelves (INOX)
- double door (external solid, internal glass)
- Wi-Fi
- LAN cable
- LabDesk software

## AVAILABLE VERSIONS

- Smart PRO
- KK with ultrasonic humidifier
- KKS with steam humidifier
- FIT phytotron

## SOFTWARE

- LabDesk for downloading data to a computer (via LAN or Wi-Fi)

## Application

- growth of plants and fungus
- seeds germination
- microorganisms and insects breeding
- photostability tests
- food preservation tests
- tests of building materials



## Climatic chambers with phytotron system (\* /FIT option) except KKS models

- temperature, humidity and light control
- temperature range with light OFF: 0°C ... +60°C
- temperature range with light ON: +10°C ... +50°C
- light colour selection
- max light intensity 15000 lx per FIT P panel (measured 25 cm under the light source)
- day/night simulation with light intensity control
- fluorescent light tubes located in:
  - door and side walls
  - side walls
  - door
  - over-shelf panels
- LED modules located in:
  - over-shelf panels
  - side walls



**FIT D** - light tubes installed in door



**FIT S** - light tubes installed in side walls

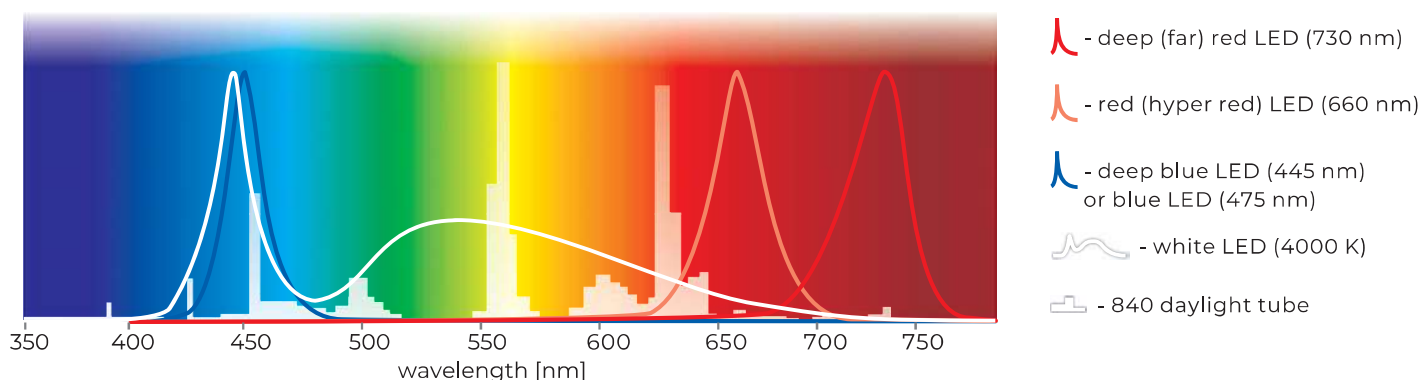


**FIT DS** - light tubes installed in door and side walls

Climatic chambers equipped with phytotron system can control temperature and humidity, as well as light intensity to simulate day and night conditions. Standard light colour is 840 type and the tubes can be installed in the door, side walls or over-shelf panels.

There are also special LED panels designed for plant growing. As most plants use only a part of the sunlight emission, narrow spectrum and specific colours have been used. A and B chlorophyll absorbance maxima are blue and red colour. Chlorophyll absorbs most energy and strongly influences photosynthesis at blue colour spectrum which intensifies growth. Hyper and far red colours stimulate blooming and proliferation.

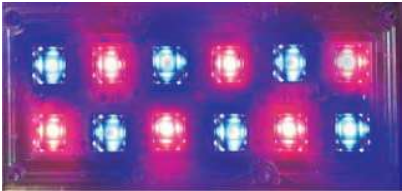
|        | KK 115 | KK 240 | KK 350 | KK 400 | KK 500 | KK 700 | KK 750 | KK 1200 | KK 1450 |
|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|
| FIT P  | +      | +      |        | +      | +      | +      | +      | +       | +       |
| FIT D  | +      | +      |        |        |        |        | +      |         |         |
| FIT S  |        |        | +      |        | +      | +      |        |         |         |
| FIT DS |        |        | +      |        | +      | +      |        |         |         |



Climatic and phytotron chambers can be adapted to individual customer requirements. A wide range of additional equipment and the possibility of implementing non-standard solutions makes these units satisfy even the most demanding users.



Panel for **FIT P** version



Panel for **FIT P LED** version



Panel for **FIT P LED White** version

Available fluorescent light tubes

- standard type 840 for daylight simulation
- UV tubes for air sterilization and aging tests

Light intensity of a panel:

- FIT P type 840 ~280  $\mu\text{mol}/\text{m}^2\text{s}$
- FIT P LED white 4000 K ~800  $\mu\text{mol}/\text{m}^2\text{s}$  (25 cm distance from a shelf).

Available LED modules

- red (hyper red) – max for wavelength 660 nm
- deep blue – max for wavelength 445 nm
- blue – max for wavelength 475 nm
- deep (far) red – max for wavelength 730 nm
- white – colour temperature 4000 K

The dimmable over-shelf panels can be provided with several independently controlled colours of light. Other configurations on request.

 **FIT P version**

Climatic chambers with over-shelf panels with light. Depending on the model, there can be between 1 and 3 panels inside the chamber (standard light colour: 840 daylight). The FIT P version includes 1 over-shelf panel and sockets to allow installation of extra panels if required (to be ordered separately).

The FIT/R3 option allows to control the light intensity separately for each panel.

|                                   |             | KK 115                                                                              | KK 240                                                                              | KK 400                                                                              | KK 500                                                                                | KK 700                                                                                | KK 750                                                                                | KK 1200                                                                               | KK 1450                                                                               |
|-----------------------------------|-------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                   |             |  |  |  |  |  |  |  |  |
| standard                          |             | 1                                                                                   | 1                                                                                   | 1                                                                                   | 1                                                                                     | 1                                                                                     | 1                                                                                     | 1                                                                                     | 1                                                                                     |
| max*                              |             | 1                                                                                   | 2                                                                                   | 2                                                                                   | 3                                                                                     | 3                                                                                     | 3                                                                                     | 3                                                                                     | 3                                                                                     |
| max light intensity on shelf [lx] | FIT version | 5000                                                                                | 10000                                                                               | 15000                                                                               | 15000                                                                                 | 15000                                                                                 | 15000                                                                                 | 15000                                                                                 | 15000                                                                                 |

\*max number of over-shelf panels with illumination inside the chamber

 **FIT P LED version**

The user can choose the light colour and intensity for each program segment. The colour modules can be combined, e.g. far red with blue. Dimming allows to set the required level of intensity. This flexibility provides specific light selection for each plant. The LED modules are long-life – after 25000 operating hours they still feature 90% of the nominal efficiency. The unique optics ensures uniform light distribution for each plant. The LED technology also emits very little heat which helps maintain precise temperature inside the chamber.

The FIT/R3 option allows independent control of each panel and/or each light colour.

## Climatic chambers

■ **Climatic chambers** with an ultrasonic humidifier are professional and reliable equipment to guarantee stable and precise conditions. They can be used for seed germination, fungus and plant growing or food tests. Perfect climatic conditions allow you to perform stability tests of pharmaceuticals and cosmetics, as well as packaging and electronics.

The ultrasonic humidifier uses piezo-electric generators which convert electrical energy into mechanical vibrations energy. The generators are immersed in deionized water and smash it into very small drops which are consequently sprayed uniformly inside the chamber.

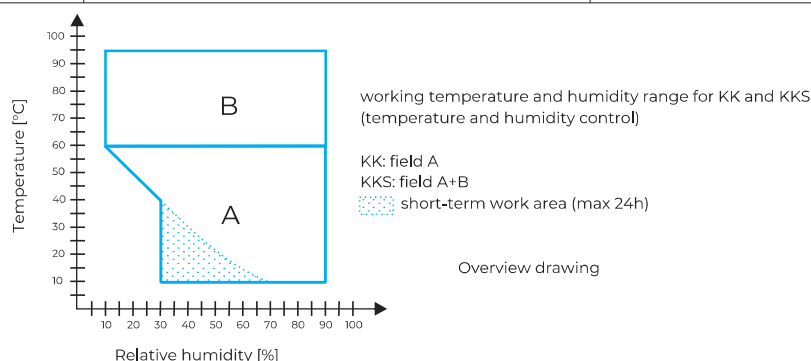


■ The **KKS climatic chambers** with a steam humidifier do not emit ultrasounds and therefore allow insects breeding (e.g. *Drosophila melanogaster*). Compared to the KK chambers, they feature an extended temperature and humidity range and can be used for tests of electronics, plastic or building materials.

The steam humidifier (steam generator) is a closed boiler that produces steam with higher pressure than atmospheric. The heat required to produce steam is obtained by a heater placed in a boiler. Much higher temperature and humidity range is used in more applications in comparison to KK units.

The KK and KKS climatic chambers can be used for pharmaceutical stability tests according to **ICH Q1A**.

| Parameter                   |     | Climatic chamber KK<br>with ultrasonic humidifier                                                                                                         | Climatic chamber KKS<br>with steam humidifier                                            |
|-----------------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| temperature range           | -   | 0°C... +60°C                                                                                                                                              | 0°C... +100°C                                                                            |
|                             | FIT | 0°C... +60°C<br>(+10°C...+50°C with light on)                                                                                                             | -                                                                                        |
| relative humidity range     |     | field "A"                                                                                                                                                 | field "A+B"                                                                              |
| water supply (conductivity) |     | deionized (<1 µS/cm)                                                                                                                                      | tap water (125-1250 µS/cm)                                                               |
| water source                |     | <ul style="list-style-type: none"> <li>■ deionized water container (included)</li> <li>■ internal deionized water network</li> <li>■ deionizer</li> </ul> | <ul style="list-style-type: none"> <li>■ water supply system</li> </ul>                  |
| outflow                     |     | <ul style="list-style-type: none"> <li>■ drain system</li> </ul>                                                                                          | <ul style="list-style-type: none"> <li>■ drain system</li> </ul>                         |
| power supply                |     | <ul style="list-style-type: none"> <li>■ 230V 50-60Hz</li> </ul>                                                                                          | <ul style="list-style-type: none"> <li>■ 230V 50-60Hz</li> <li>■ 400V 50-60Hz</li> </ul> |



|                                                           |             |  |  |  |  |  |  |  |  |  |
|-----------------------------------------------------------|-------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Parameter                                                 |             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| air convection                                            |             | forced                                                                            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| chamber capacity [l]                                      |             | 109                                                                               | 240                                                                               | 322                                                                               | 416                                                                               | 470                                                                               | 600                                                                                 | 749                                                                                 | 1330                                                                                | 1485                                                                                |
| working capacity [l]                                      |             | 109                                                                               | 240                                                                               | 283                                                                               | 416                                                                               | 392                                                                               | 485                                                                                 | 749                                                                                 | 1132                                                                                | 1264                                                                                |
| door type                                                 |             | double (external solid, internal glass) / external glass (option)                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| temperature range [°C]                                    | -           | 0...+60                                                                           |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                                                           | FIT version | 0...+60 (with light on +10...+50)                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| temperature resolution [°C]                               |             | every 0,1                                                                         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| relative humidity range [%]                               |             | 30...90 (see working temperature and humidity chart for details on page 70)       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| humidity resolution [%]                                   |             | every 1                                                                           |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| controller                                                |             | microprocessor PID with external 7" full colour touch screen                      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| interior                                                  |             | acid-proof stainless steel to DIN 1.4301                                          |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| housing                                                   | -           | powder coated sheet                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                                                           | IG          | stainless steel linen finish                                                      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| overall dims¹ [mm]                                        | A width     | 670                                                                               | 830                                                                               | 660                                                                               | 1030                                                                              | 660                                                                               | 750                                                                                 | 1270                                                                                | 1480                                                                                | 1460                                                                                |
|                                                           | B height    | 1340                                                                              | 1600                                                                              | 2000                                                                              | 1850                                                                              | 1990                                                                              | 1990                                                                                | 2010                                                                                | 1990                                                                                | 1940                                                                                |
|                                                           | C depth     | 950                                                                               | 1010                                                                              | 990                                                                               | 1010                                                                              | 1080                                                                              | 1140                                                                                | 1120                                                                                | 1130                                                                                | 1240                                                                                |
| internal dims [mm]                                        | D width     | 460                                                                               | 600                                                                               | 470                                                                               | 800                                                                               | 470                                                                               | 530                                                                                 | 1040                                                                                | 1270                                                                                | 1270                                                                                |
|                                                           | D' width    | -                                                                                 | -                                                                                 | 510                                                                               | -                                                                                 | 510                                                                               | 600                                                                                 | -                                                                                   | 1330                                                                                | 1340                                                                                |
|                                                           | E height    | 530                                                                               | 800                                                                               | 1340                                                                              | 1040                                                                              | 1510                                                                              | 1510                                                                                | 1200                                                                                | 1510                                                                                | 1460                                                                                |
|                                                           | F depth     | 440                                                                               | 500                                                                               | 500                                                                               | 500                                                                               | 600                                                                               | 650                                                                                 | 600                                                                                 | 650                                                                                 | 750                                                                                 |
|                                                           | I height    | -                                                                                 | -                                                                                 | 1180                                                                              | -                                                                                 | 1360                                                                              | 1350                                                                                | -                                                                                   | 1330                                                                                | 1270                                                                                |
| max shelf workload² [kg]                                  | -           | 10                                                                                | 10                                                                                | 10                                                                                | 10                                                                                | 20                                                                                | 30                                                                                  | -                                                                                   | 30                                                                                  | 30                                                                                  |
|                                                           | PW³ version | 50                                                                                | 100                                                                               | 100                                                                               | 100                                                                               | 100                                                                               | 100                                                                                 | 100                                                                                 | 100                                                                                 | 100                                                                                 |
| max unit workload [kg]                                    |             | 60                                                                                | 90                                                                                | 100                                                                               | 120                                                                               | 100                                                                               | 150                                                                                 | 140                                                                                 | 300                                                                                 | 300                                                                                 |
| nominal power [W]                                         |             | 1350                                                                              | 1550                                                                              | 1850                                                                              | 2250                                                                              | 1850                                                                              | 1850                                                                                | 2850                                                                                | 3450                                                                                | 3450                                                                                |
| weight [kg]                                               |             | 90                                                                                | 170                                                                               | 125                                                                               | 185                                                                               | 130                                                                               | 170                                                                                 | 275                                                                                 | 220                                                                                 | 230                                                                                 |
| temperature variation* at +25°C i and 60%rH [±/- °C]      |             | 2,0                                                                               | 2,0                                                                               | 2,0                                                                               | 2,0                                                                               | 2,0                                                                               | 2,0                                                                                 | 2,0                                                                                 | 2,0                                                                                 | 2,0                                                                                 |
| relative humidity variation* at +25°C and 60%rH [±/- %rH] |             | 5,0                                                                               | 5,0                                                                               | 5,0                                                                               | 5,0                                                                               | 5,0                                                                               | 5,0                                                                                 | 5,0                                                                                 | 5,0                                                                                 | 5,0                                                                                 |
| temperature protection                                    |             | class 3.3 to DIN 12880                                                            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| power supply**                                            |             | 230 V 50-60Hz                                                                     |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| shelves fitted/max                                        |             | 2 / 7                                                                             | 3 / 10                                                                            | 3 / 11                                                                            | 3 / 14                                                                            | 3 / 11                                                                            | 3 / 11                                                                              | 5 / 16                                                                              | 2 x 3 / 11                                                                          | 2 x 3 / 11                                                                          |
| refrigerant                                               |             | R1234ze / GWP=1                                                                   | R290 / GWP=3                                                                      |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| warranty                                                  |             | 24 months                                                                         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| manufacturer                                              |             | POL-EKO                                                                           |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

all the above technical data refer to standard units (without optional accessories)

\* - variation (K) calculated for chamber as:  $K = \frac{T_{avg\ max} - T_{avg\ min}}{2}$

\*\* - other power supplies on request

1 - external dimensions for units without FIT option, depth doesn't include 50 mm of power cable

2 - on uniformly loaded surface

3 - reinforced shelf

## OPTIONS AND ACCESSORIES (icon description see page 80-86)



|                                                           |             | KKS 115                                                                           | KKS 240                                                                           | KKS 400                                                                             | KKS 750                                                                             |
|-----------------------------------------------------------|-------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                                           |             |  |  |  |  |
| Parameter                                                 |             |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
| air convection                                            |             | forced                                                                            |                                                                                   |                                                                                     |                                                                                     |
| chamber capacity [l]                                      |             | 109                                                                               | 240                                                                               | 416                                                                                 | 749                                                                                 |
| working capacity [l]                                      |             | 109                                                                               | 240                                                                               | 416                                                                                 | 749                                                                                 |
| door type                                                 |             | double (external solid, internal glass) / external glass (option)                 |                                                                                   |                                                                                     |                                                                                     |
| temperature range [°C]                                    |             | 0...+100                                                                          |                                                                                   |                                                                                     |                                                                                     |
| temperature resolution [°C]                               |             | every 0,1                                                                         |                                                                                   |                                                                                     |                                                                                     |
| relative humidity range [%]                               |             | 30...90 (see working temperature and humidity chart for details on page 70)       |                                                                                   |                                                                                     |                                                                                     |
| humidity resolution [%]                                   |             | every 1                                                                           |                                                                                   |                                                                                     |                                                                                     |
| controller                                                |             | microprocessor PID with external 7" full colour touch screen                      |                                                                                   |                                                                                     |                                                                                     |
| interior                                                  |             | acid-proof stainless steel to DIN 1.4301                                          |                                                                                   |                                                                                     |                                                                                     |
| housing                                                   | -           | powder coated sheet                                                               |                                                                                   |                                                                                     |                                                                                     |
|                                                           | IG          | stainless steel linen finish                                                      |                                                                                   |                                                                                     |                                                                                     |
| overall dims¹ [mm]                                        | A width     | 670                                                                               | 830                                                                               | 1030                                                                                | 1270                                                                                |
|                                                           | B height    | 1340                                                                              | 1600                                                                              | 1850                                                                                | 2010                                                                                |
|                                                           | C' depth    | 820                                                                               | 880                                                                               | 880                                                                                 | 990                                                                                 |
| internal dims [mm]                                        | D width     | 460                                                                               | 600                                                                               | 800                                                                                 | 1040                                                                                |
|                                                           | E height    | 530                                                                               | 800                                                                               | 1040                                                                                | 1200                                                                                |
|                                                           | F depth     | 440                                                                               | 500                                                                               | 500                                                                                 | 600                                                                                 |
| max shelf workload² [kg]                                  | -           | 10                                                                                | 10                                                                                | 10                                                                                  | -                                                                                   |
|                                                           | PW³ version | 50                                                                                | 100                                                                               | 100                                                                                 | 100                                                                                 |
| max unit workload [kg]                                    |             | 60                                                                                | 90                                                                                | 120                                                                                 | 140                                                                                 |
| nominal power [W]                                         |             | 2900                                                                              | 3250                                                                              | 3650                                                                                | 4250                                                                                |
| weight [kg]                                               |             | 122                                                                               | 140                                                                               | 185                                                                                 | 275                                                                                 |
| temperature variation* at +25°C and 60%rH [±/- °C]        |             | 2,0                                                                               | 2,0                                                                               | 2,0                                                                                 | 2,0                                                                                 |
| relative humidity variation* at +25°C and 60%rH [±/- %rH] |             | 5,0                                                                               | 5,0                                                                               | 5,0                                                                                 | 5,0                                                                                 |
| temperature protection                                    |             | class 3.3 to DIN 12880                                                            |                                                                                   |                                                                                     |                                                                                     |
| power supply**                                            |             | 230V 50-60Hz                                                                      |                                                                                   | 400V 50-60Hz                                                                        |                                                                                     |
| shelves fitted/max                                        |             | 2 / 7                                                                             | 3 / 10                                                                            | 3 / 14                                                                              | 5 / 16                                                                              |
| refrigerant                                               |             | R1234ze / GWP=1                                                                   | R290 / GWP=3                                                                      |                                                                                     |                                                                                     |
| warranty                                                  |             | 24 months                                                                         |                                                                                   |                                                                                     |                                                                                     |
| manufacturer                                              |             | POL-EKO                                                                           |                                                                                   |                                                                                     |                                                                                     |

all the above technical data refer to standard units (without optional accessories)

\* - fluctuation measured in centre of chamber; in space, variation (K) calculated for chamber as:  $K = \frac{T_{avg\ max} - T_{avg\ min}}{2}$

\*\* - other power supplies on request

1 - external dimensions for units without FIT option, depth doesn't include 50 mm of power cable

2 - on uniformly loaded surface

3 - reinforced shelf

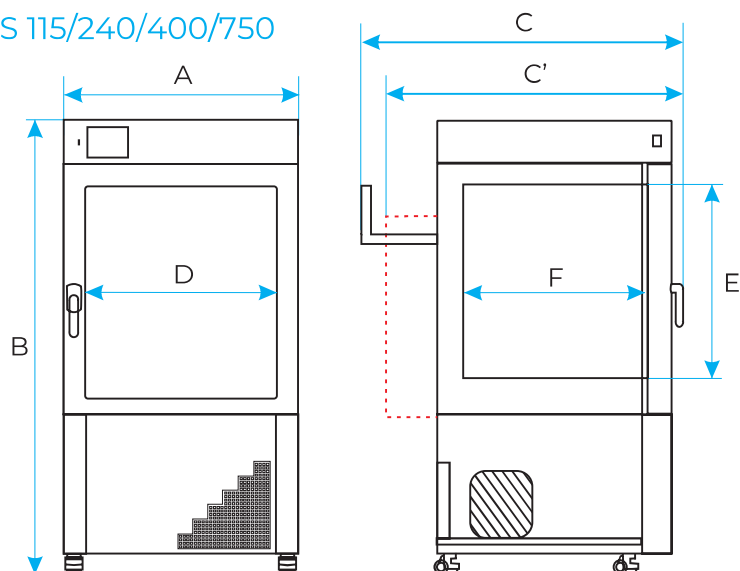
Reverse osmosis system included, external dimensions of the unit do not include the reverse osmosis system (14 kg).

## OPTIONS AND ACCESSORIES (icon description see page 80-86)

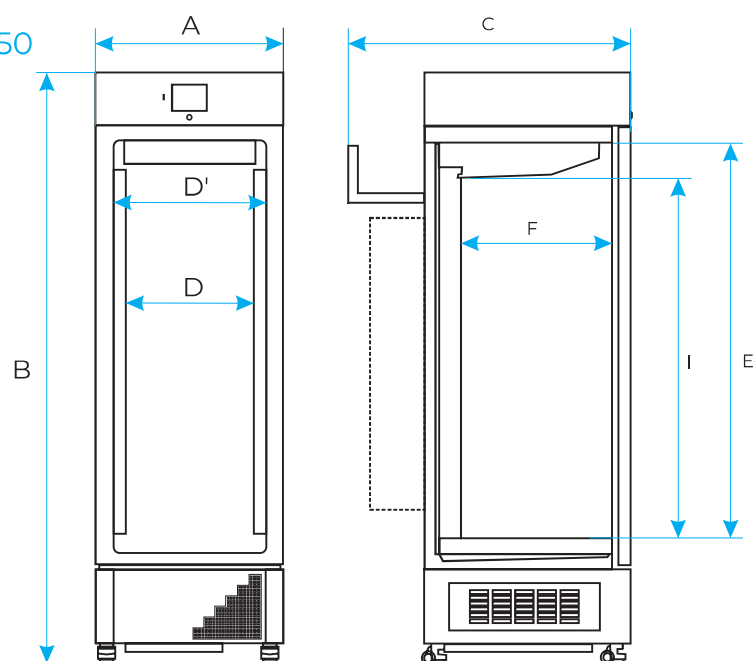




### ■ Dimensions KK/KKS 115/240/400/750



### ■ Dimensions KK 350



### ■ Dimensions KK 500/700/1200/1450

