

# Illumination Test Chambers.

**LC/TB-LC/TS Series**

## **FDM Environment Makers Products**

**Climatic and Thermostatic Chambers**

**Growth Chambers**

**Environmental Chambers**

**Ultrafreezers**

**Custom Products**

**F.lli Della Marca S.r.l.**

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**00176 Rome (Italy)**

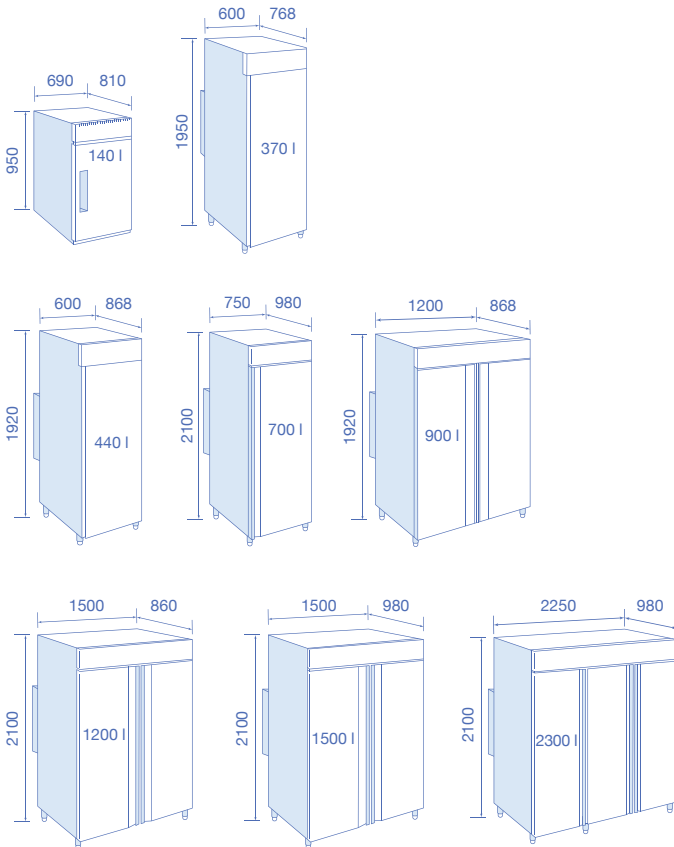
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**www.dellamarca.it**

Technical specifications are subject to change.

## Sizes



## Description

The Growth test chamber or the illumination chamber reproduces natural conditions without unpredictability, with lighting, temperature and homogeneous humidity, according to different test requirements.

Its features make the growth chamber an essential tool for agricultural and chemical research, and generally for scientific purposes.

FDM manufactures climatic growth chambers for photostability testing of all types, both standard and customized, for the laboratories of companies, universities and institutes.

Based on the type of light intensity, hence on the specific area of application, there are four different types of FDM growth chambers from the LCB-LCS series:

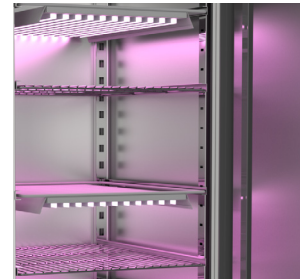
- **Daylamp** - which reproduces full spectrum sunlight.
- **Biolamp** - selected spectrum, specific for insect growth.
- **Fluolamp** - reproduces a light with a specific spectrum for plants.
- **Arablamp** - for Arabidopsis, a particular type of plant.
- **ICHlamp** - applicable according to ICH guidelines for photostability testing.

## Advantages

Capacity from 140 to 2300 liters
Adjustable temperature range -10°C...+55°C
Humidity range 10...80%.
LED and neon lighting, vertical or horizontal disposition
Programmable controller revoFACE or for stillFACE stable tests
Internal forced and homogeneous ventilation
High and low temperature and humidity alarms
Electrical power 220-240V /50Hz or 110V



Led lamps placed on the walls and homogeneity of light throughout the climatic environment.



Horizontal Led lighting, placed on single shelf with a concentrated blue and red light.

## Configuration examples



LDC700BXPRO  
DAY-ILD200LED



LDC700BXPRO  
DAY-IRD200LED



LFC1500BXPRO  
FLUO-IRD200LED

Positive Range (S)	C/T140S	C/T370S	C/T440S	C/T700S	C/T900S	C/T1200S	C/T1500S	C/T2300S
Negative Range (B)	C/T140B	C/T370B	C/T440B	C/T700B	C/T900B	C/T1200B	C/T1500B	C/T2300B
Temperature performance								
Temperature range without humidity [°C]	Light off	0...+55 (S) -10...+55 (B)						
	Light on	+5...+50 (S) -5...+50 (B)						
Temperature uniformity depending on setpoint [± K]	0.5..2.5							
Temperature fluctuation depending on setpoint [± K]	0.1..0.5							
Average heating-up rate according to EN 60068-3-5 [K/min]	Light off	+2						
Average cooling down rate according to EN 60068-3-5 [K/min]	Light off	-1	-0.6	-1	-0.6	-1	-0.6	-1
Performance Data Climate								
Temperature range [°C] with humidity on	10/55							
Humidity range in according to Chart*1 [% r.h.]	Light off	10/90						
	Light on	10/80						
Humidity fluctuation depending on setpoint [± %]	≤ 3							
Humidification system	Ultrasonic humidification system							
Water filter	Water softening filter and replaceable cartridge equipped*2							
Max Water hardness permitted	600 ppm CaCO <sub>3</sub>							
Water inlet	Pressure 0.2÷5 BAR - Temperature 10÷40°C - Pipe connection 3/4"							
Outer dimensions								
Width net [mm]	690	600	600	750	1200	1500	1500	2250
Depth net [mm]	810	768	868	980	868	860	980	980
Height net [mm]	950	1920	1920	2100	1920	2100	2100	2100
Doors								
Unit doors	1	1	1	1	2	2	2	3
Internal Dimensions								
Width [mm]	450	500	500	600	1090	1340	1300	2090
Depth [mm]	540	480	580	670	580	570	670	670
Height [mm]	520.5	1257	1257	1340	1257	1350	1340	1340
Measures								
Interior net volume [L]	130	310	370	530	810	1020	1180	1830
Net weight of the unit (empty) [kg]	78	100	110	167	197	212	215	367
Permitted load per rack [kg]	20	20	20	20	20	20	20	20
*3Fixtures								
Number of shelves (std./max.)	2/3	3/5	3/5	3/6	6/10	6/12	6/12	9/14
Shelf Width [mm]	400	460	460	530	460	530	530	530
Shelf Depth [mm]	500	470	570	650	570	550	650	650
stillFACE Controller								
Controller	Constant monitoring temperature and humidity controllers							
Interface port	Optional: RS485							
revoFACE Programmer								
Set-up Display	Programme status, set up temperature and humidity, date, time and language							
Programmer	10 programs and 50 segments each, adjustable from 1 min. to 999 hrs.							
Calibration	Possibility to calibrate all parameters							
Interface port	Optional: RS485 - Optional: Ethernet - Wifi - Dedicated mobile app							

\*2The cartridge should be change every 4÷6 months at most.

\*3The installation of fluoresent walls illumination reduces the useful width of the shelves: for 140,370,440,900 liters size is reduced of 160 mm for 700, 1200, 1500 liters volume size is reduced of 100 mm. The led walls illumination reduces the useful width of the shelves: for 370, 440, 900 liters is reduced of 40 mm.

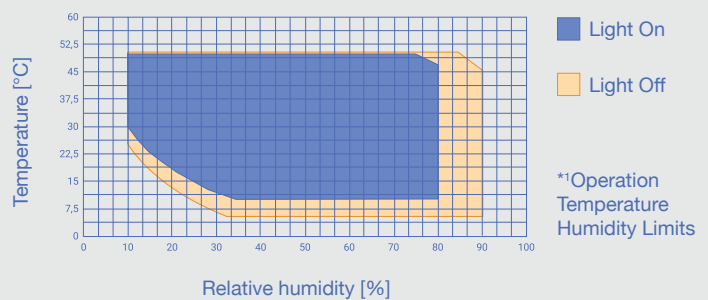
All technical data are specified for units with standard equipment at an ambient temperature of +24 °C and a voltage fluctuation of ±10 %.

Positive Range (S)	C/T140S	C/T370S	C/T440S	C/T700S	C/T1200S	C/T1200S	C/T1500S	C/T2300S	
Negative Range (B)	C/T140B	C/T370B	C/T440B	C/T700B	C/T900B	C/T1200B	C/T1500B	C/T2300B	
Environment-specific data									
Sound-pressure level [dB(A)]	60								
Structure and insulation									
Exterior material	White coated galvanized steel or full Stainless steel AISI 304								
Internal material	AISI 304 Stainless Steel								
Insulation	CFC and HCFC free								
Shelf grill	Removable and height adjustable stainless steel plastic coated								
Ventilation									
Fan	forced ventilation								
Safety									
Temperature	Class 2 independent adjustable temperature safety devices (DIN 12880)								
Alarm	Audio-Visual								
Electrical data									
Rated Voltage [V]	220/240								
Power frequency [Hz]	50								
**Nominal power [kW]	Light off (S)	1.4	1.5	1.4	1.8	2.2	2.4	2.6	2.7
	Light off (B)	1.6	1.7	1.7	2.3	2.6	2.7	2.9	3.1
Unit fuse [A]	16								
Phase (nominal voltage)	1 ~								

## Main Options

- ETH100 - Ethernet interface for remote connection
- PE100 - Interior socket coverable universal 220-230 V
- IR000 - Interior neon lighting
- IR000LED - Interior LED lighting
- SPS100 - Interior compartment glass doors
- IS200 - Dimmable adjusting light for individual lamp
- IR000LED - Interior LED lighting
- TE110 - Power supply 110 V 50-60 Hz
- CO200 - CO2 Regulation System for EN 12390-10

## Operation flowchart



- FD100 Cable hole installed on the side of the chamber that allows the passage of cables inside without loss of performance.



- UDB100 USB port for downloading test data with the possibility of viewing them on a PC in Excel format.



- GP100R The reinforced stainless steel shelf differs from the standard one (pictured above) in that it has a higher supported load capacity.



- RT100 Swivel castors with chamber lock for easy movement.



- PV101\* The touch-screen interface allows you to program segments autonomously and view the test progress in real time.



- WTO16 System of supply demineralizzate water tank 16 liters.

\*4 The nominal power with light ON varies, depending on the number and types of lamps installed.

All technical data are specified for units with standard equipment at an ambient temperature of +24 °C and a voltage fluctuation of ±10 %.

Click and go to Online Configurator

[www.dellamarca.it](http://www.dellamarca.it)

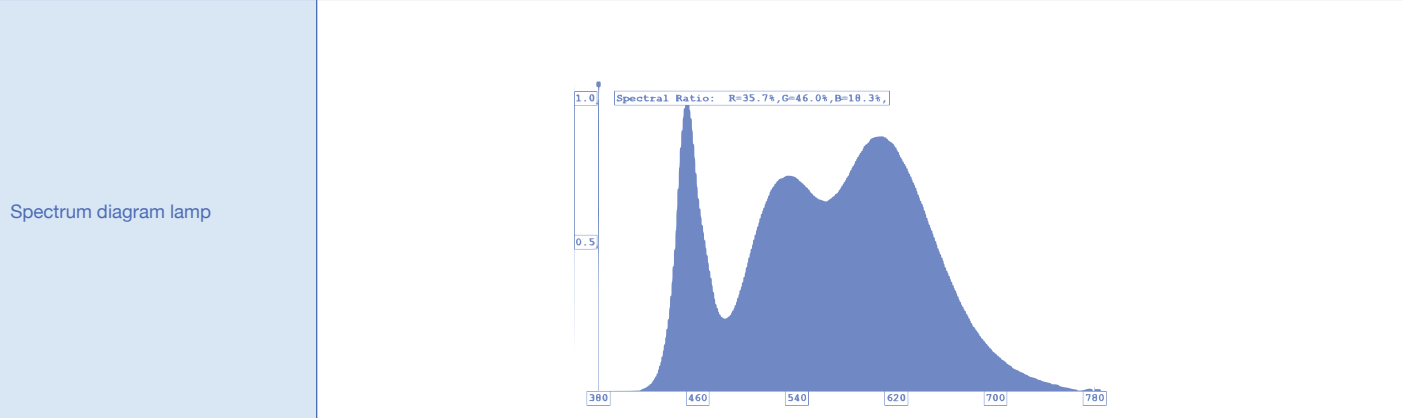
## DAYLAMP | SUNLIGHT SIMULATION

Positive Range (S)	LDC/T140S	LDC/T370S	LDC/T440S	LDC/T700S	LDC/T900S	LDC/T1200S	LDC/T1500S	LDC/T2300S
Negative Range (B)	LDC/T140B	LDC/T370B	LDC/T440B	LDC/T700B	LDC/T900B	LDC/T1200B	LDC/T1500B	LDC/T2300B

*5Temperature performance Light on	
At 0% light [°C]	(S) 0...+55 (B) -10...+55
At 100% light [°C]	(S) 5...+50 (B) -5...+50

*6Horizontal Shelf Illumination	
Illumination on Shelf [W/m²]	45      52      43      47      43      47      47      47
Illumination on Shelf [LUX]	10.500    13.000    13.000    16.000    13.000    16.000    16.000    16.000

*7Vertical Walls Illumination	
Lateral inner walls illumination [LUX]	10.000    12.000    15.000    18.000    15.000    15.000    18.000    18.000



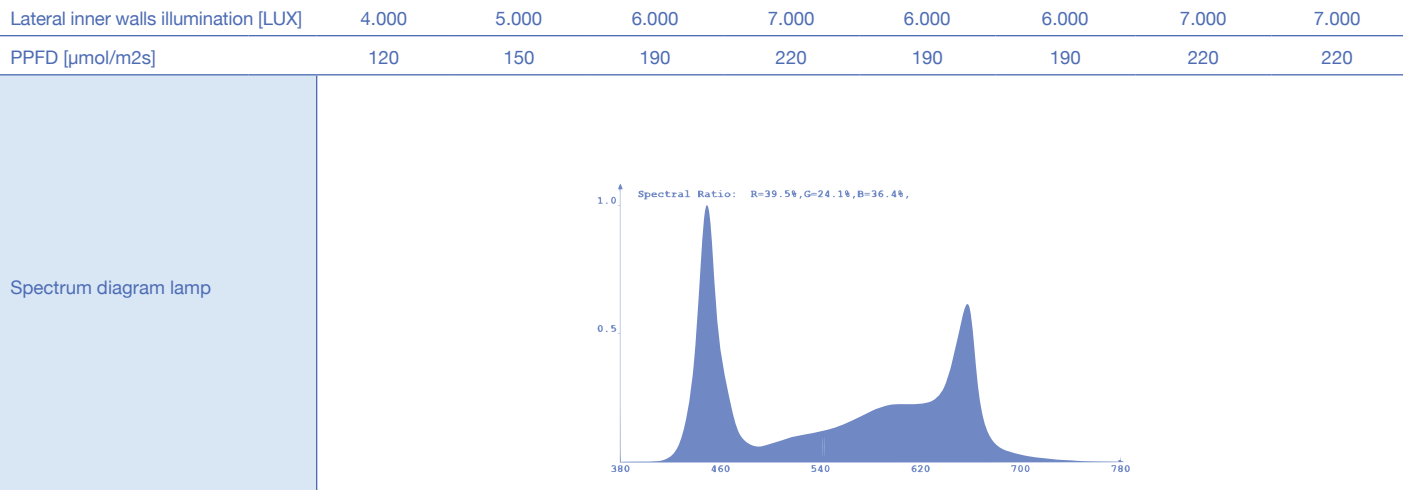
## FLUOLAMP | ACCELERATED PLANT GROWTH

Positive Range (S)	LFC/T140S	LFC/T370S	LFC/T440S	LFC/T700S	LFC/T900S	LFC/T1200S	LFC/T1500S	LFC/T2300S
Negative Range (B)	LFC/T140B	LFC/T370B	LFC/T440B	LFC/T700B	LFC/T900B	LFC/T1200B	LFC/T1500B	LFC/T2300B

*5Temperature performance Light on	
At 0% light [°C]	(S) 0...+55 (B) -10...+55
At 100% light [°C]	(S) 5...+50 (B) -5...+50

*6Horizontal Shelf Illumination	
Illumination on Shelf [W/m²]	45      52      43      47      43      47      47      47
Illumination on Shelf [LUX]	4.500    4.500    5.000    6.500    5.000    6.500    6.500    6.500

*7Vertical Walls Illumination	
Lateral inner walls illumination [LUX]	4.000    5.000    6.000    7.000    6.000    6.000    7.000    7.000
PPFD [µmol/m2s]	120      150      190      220      190      190      220      220



## BIOLAMP | INSECT AND BACTERIA INCUBATION

Positive Range (S)	LBC/T140S	LBC/T370S	LBC/T440S	LBC/T700S	LBC/T900S	LBC/T1200S	LBC/T1500S	LBC/T2300S
Negative Range (B)	LBC/T140B	LBC/T370B	LBC/T440B	LBC/T700B	LBC/T900B	LBC/T1200B	LBC/T1500B	LBC/T2300B

### \*5Temperature performance Light on

At 0% light [°C]	(S)	0...+55						
	(B)	-10...+55						
At 100% light [°C]	(S)	5...+50						
	(B)	-5...+50						

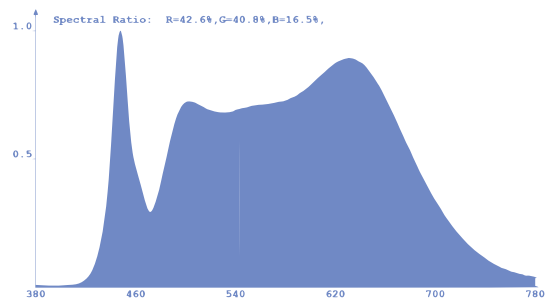
### \*6Horizontal Shelf Illumination

Illumination on Shelf [W/m²]	n.d.	n.d.	n.d.	47	n.d.	47	47	47
Illumination on Shelf [LUX]	n.d.	n.d.	n.d.	12.000	n.d.	12.000	12.000	12.000

### \*7Vertical Walls Illumination

Lateral inner walls illumination [LUX]	7.000	8.000	10.000	13.000	10.000	10.000	13.000	13.000
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Spectrum diagram lamp



## ARABLAMP | ARABIDOPSIS GROWTH ACCELERATION

Positive Range (S)	LAC/T140S	LAC/T370S	LAC/T440S	LAC/T700S	LAC/T900S	LAC/T1200S	LAC/T1500S	LAC/T2300S
Negative Range (B)	LAC/T140B	LAC/T370B	LAC/T440B	LAC/T700B	LAC/T900B	LAC/T1200B	LAC/T1500B	LAC/T2300B

### \*5Temperature performance Light on

At 0% light [°C]	(S)	0...+55						
	(B)	-10...+55						
At 100% light [°C]	(S)	5...+50						
	(B)	-5...+50						

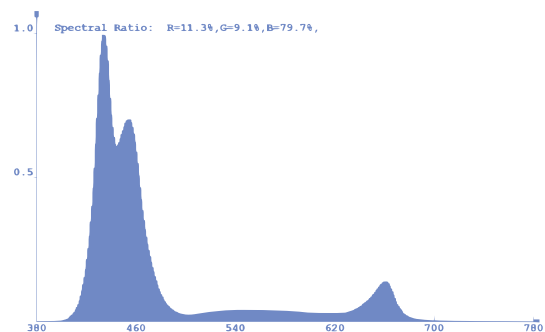
### \*6Horizontal Shelf Illumination

Illumination on Shelf [W/m²]	n.d.	n.d.	n.d.	44	n.d.	44	44	44
Illumination on Shelf [LUX]	n.d.	n.d.	n.d.	12.000	n.d.	12.000	12.000	12.000
PPFD [µmol/m2s]	n.d.	n.d.	n.d.	440	n.d.	440	440	440

### \*7Vertical Walls Illumination

Lateral inner walls illumination [LUX]	8.000	10.000	12.000	14.000	12.000	12.000	14.000	14.000
PPFD [µmol/m2s]	230	280	350	420	350	350	420	420

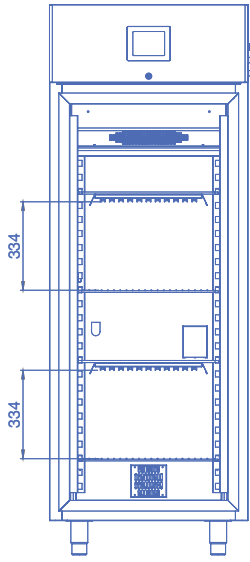
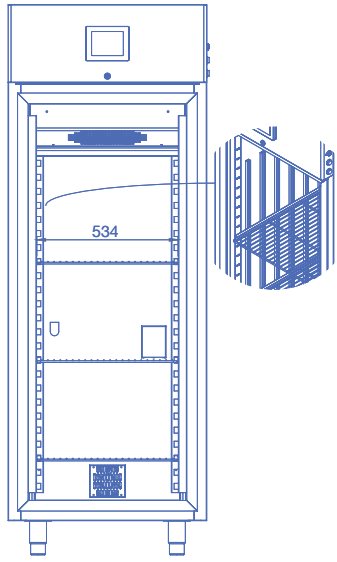
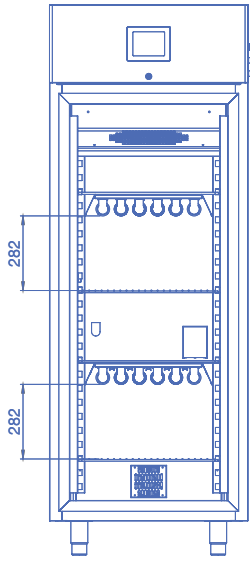
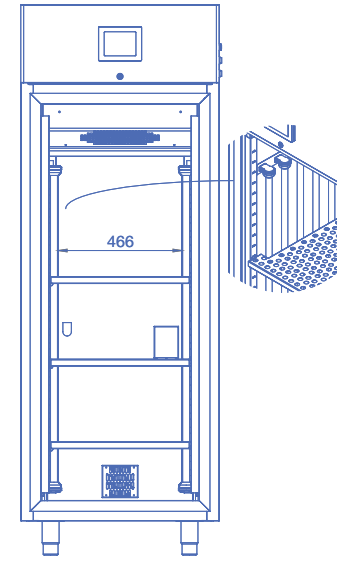
Spectrum diagram lamp



## PRODUCT CODE GENERATOR

L-D/F/B/A	T/C	140	S/B
D- Daylamp F- Fluolamp B- Biolamp A- Arablabb	Temperature (T) or Climate (C) Control	Internal volume from 140 up to 2300 liters	S- T.range 0°/55°C  B- T.range -10°/+55°C

### LAYOUT AND DIMENSIONS WITH LAMPS NEON OR LED

	Horizontal Shelf Lamps	Vertical Wall Lights
700 liters chamber with LED lamps		
700 liters chamber with FLUORESCENT lamps		

\*5This data are specified with Fluorescent Lamps. With LED lamps installed the lux and PPFd values could vary by  $\pm 10\%$ . The  $W/m^2$  decrease around 20%.

\*6This data are for shelf illumination at a distance of 15 cm from the lamps. Data are valid for new lamps at a temperature of 20°C. Please consider that illuminance power of lamps will decrease over time.

\*7The installation of fluorescent walls illumination reduces the useful width of the shelves: for 140,370,440,900 liters size is reduced of 160 mm for 600, 700, 1200, 1500 liters volume size is reduced of 100 mm. The led walls illumination reduces the useful width of the shelves: for 370, 440, 900 liters is reduced of 40 mm.

For all type of lamp the humidity data is: Humidity range [% RH] 10 to 80, Humidity fluctuation  $\leq 3 \pm$  % RH

n.d. = not available