FDM Environment Makers Products
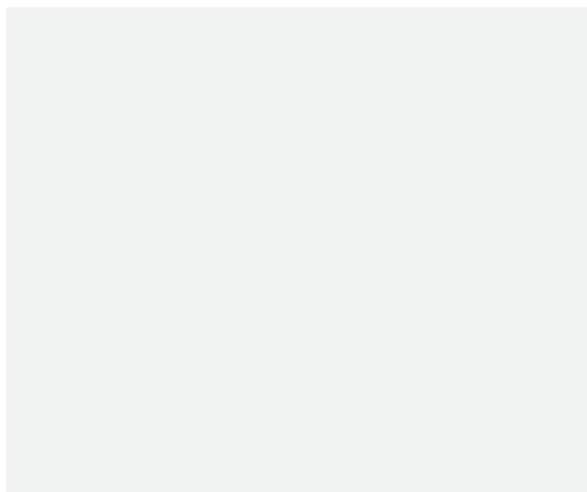Climatic & Termostatic Chambers
Growth Chambers
Environmental Chambers
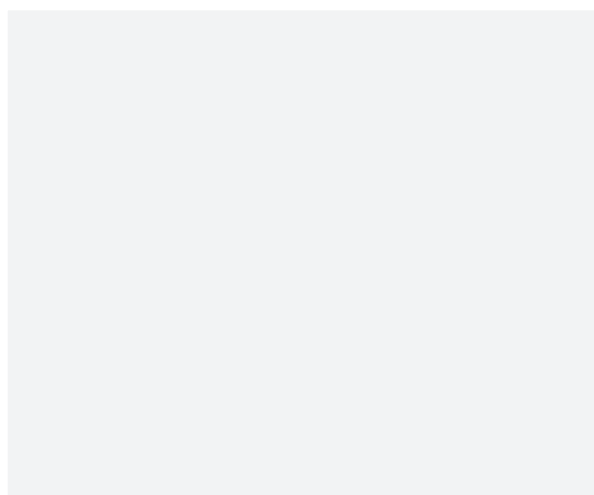Ultrafreezers
Customised Solution

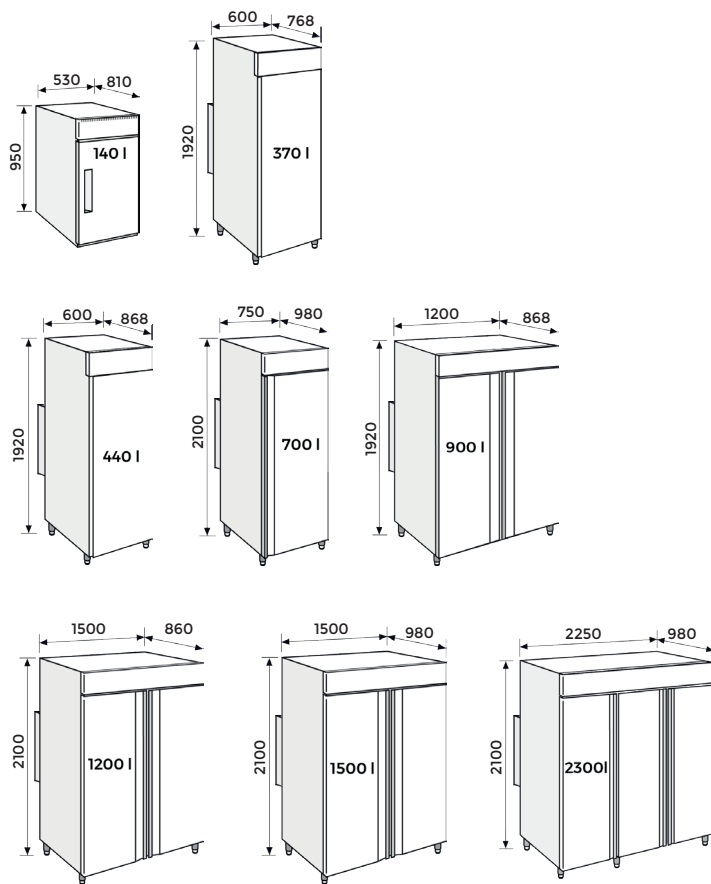# Growth Test Chambers

LCB-LCS Series

Sizes

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 – towards the yellow area of the spectrum, specific 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/T140*S*	C/T370*S*	C/T700*S*	C/T900*S*	C/T1200*S*	C/T1500*S*	C/T2300*S*
Negative Range (*B*)		C/T140*B*	C/T370*B*	C/T700*B*	C/T900*B*	C/T1200*B*	C/T1500*B*	C/T2300*B*
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	
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 humidifcation system						
Water filter		Water softening filter and replaceable cartridge equipped*[2]						
Max Water hardness permitted		600 ppm CaCO$_3$						
Water inlet		Pressure 0.2÷5 BAR - Temperature 10÷40°C - Pipe connection 3/4"						
Outer dimensions								
Width net [mm]		530	600	750	1200	1500	1500	2250
Depth net [mm]		810	768	980	868	860	980	980
Height net [mm]		950	1920	2100	1920	2100	2100	2100
Doors								
Unit doors		1	1	1	2	2	2	3
Internal Dimensions								
Width [mm]		450	500	600	1090	1340	1300	2090
Depth [mm]		540	480	670	580	570	670	670
Height [mm]		520.5	1257	1340	1257	1350	1340	1340
Measures								
Interior net volume [L]		130	310	530	810	1020	1180	1830
Net weight of the unit (empty) [kg]		78	100	167	197	212	215	367
Permitted load per rack [kg]		20	20	20	20	20	20	20
*[3]**Fixtures**								
Number of shelves (std./max.)		2/3	3/5	3/6	6/10	6/12	6/12	9/14
Shelf Width [mm]		400	460	530	460	530	530	530
Shelf Depth [mm]		500	470	650	570	550	650	650
*still**FACE Controller**								
Controller		Constant monitoring temperature and humidity controllers						
Interface port		Optional: RS485						
*revo**FACE 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						

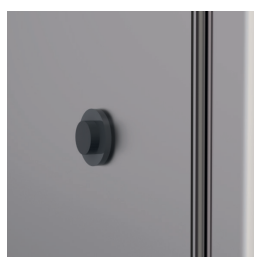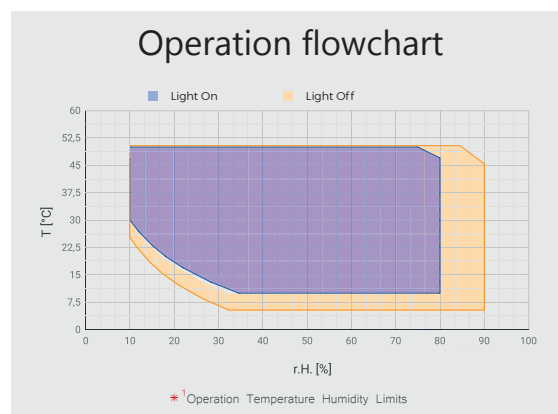*[2]The cartridge should be change every 4÷6 months at most.

*[3]The 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 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/T140*S*	C/T370*S*	C/T440*S*	C/T700*S*	C/T900*S*	C/T1200*S*	C/T1500*S*	C/T2300*S*
Negative Range (*B*)		C/T140*B*	C/T370*B*	C/T440*B*	C/T700*B*	C/T900*B*	C/T1200*B*	C/T1500*B*	C/T2300*B*
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 steel grid					
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				
*[4]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

* [1]Operation Temperature Humidity Limits

- 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.

- revoFACE

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 %.
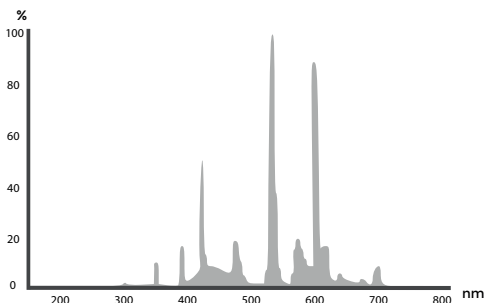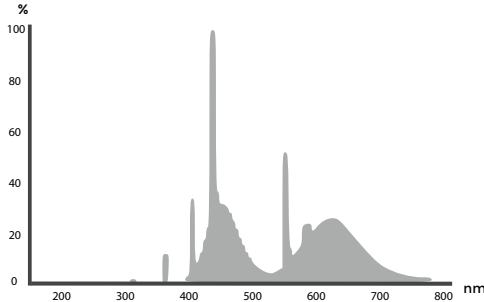
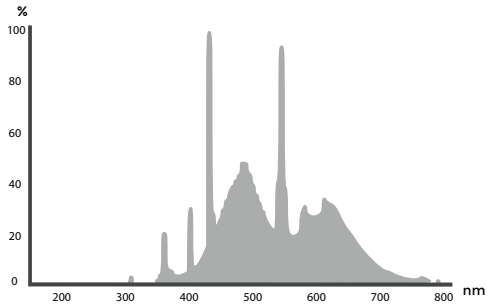Click and go to Online Configurator
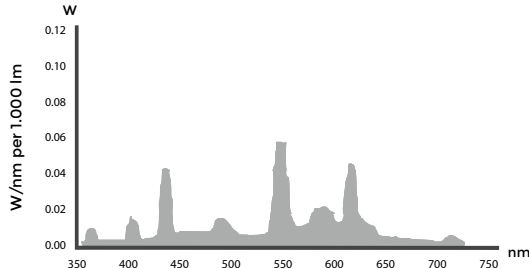
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Daylamp | Sunlight Simulation

Positive Range (S)		DC/T140S	LDC/T370S	LDC/T440S	LDC/T700S	LDC/T900S	LDC/T1200S	LDC/T1500S	LDC/T2300S
Negative Range (B)		DC/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
Spectrum diagram lamp									

Fluolamp | Accelerated Plant Growth

Positive Range (S)		FC/T140S	LFC/T370S	LFC/T440S	LFC/T700S	LFC/T900S	LFC/T1200S	LFC/T1500S	LFC/T2300S
Negative Range (B)		FC/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
PPFD [µmol/m2s]		150	150	170	230	170	230	230	230
*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
Spectrum diagram lamp									

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
*5 Temperature performance Light on								
At 0% light [°C] (S)				0...+55				
At 0% light [°C] (B)				-10...+55				
At 100% light [°C] (S)				5...+50				
At 100% light [°C] (B)				-5...+50				
*6 Horizontal 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
*7 Vertical Walls Illumination								
Lateral inner walls illumination [LUX]	7.000	8.000	10.000	13.000	10.000	10.000	13.000	13.000

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

*[5] This data are specified with Fluorescent Lamps. With LED lamps installed the lux and PPFD values could vary by ± 10%. The W/m² decrease around 20%.

*[6] This 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.

*[7] The 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 ≤ 3 ± % RH

n.d. = not available