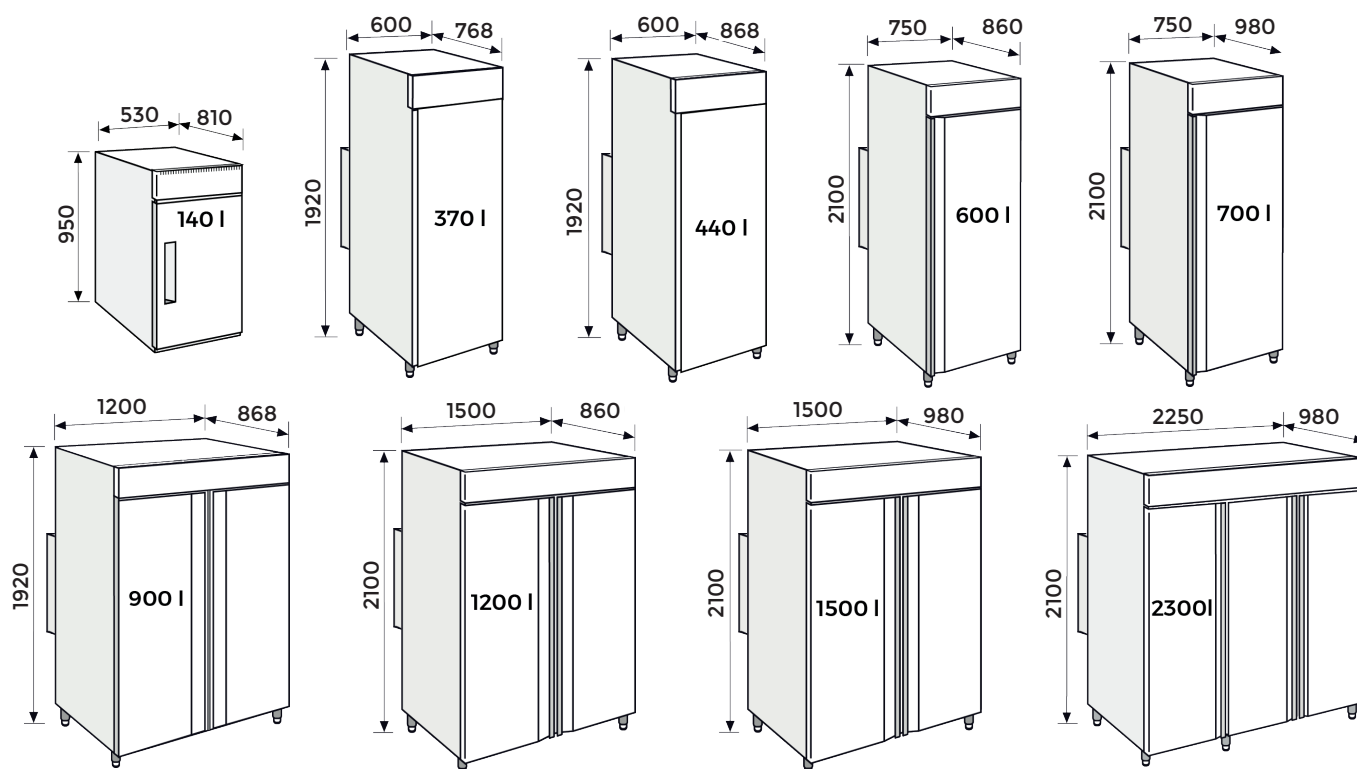


Chambers with Illumination

LCB-LCS Series



EQUIPMENT



Volumes

140...2300 liters



Temperature

0°C...+55°C (S)
-10°C...+55°C (B)



Humidity

10 to 80% r.h.



Light shelf

Removable and height-adjustable shelf



stillFACE

Controller for stability testing



revoFACE

Programmer for dynamic testing



Fan

Forced ventilation



Alarms

High/low temperature and humidity



Electric power

220-240V ~ /50 Hz or
110-115V ~ /60 Hz

N-Wissen GmbH

	FDML-130	FDML-310	FDML-370	FDML-450	FDML-530	FDML-810	FDML-1020	FDML-1180	FDML-1830
Positive Range (S)	140S	370S	440S	600S	700S	900S	1200S	1500S	2300S
Negative Range (B)	140B	370B	440B	600B	700B	900B	1200B	1500B	2300B
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				
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 humidfication 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	600	750	750	1200	1500	1500	2250
Depth net [mm]	810	768	868	860	980	868	860	980	980
Height net [mm]	950	1920	1920	2100	2100	1920	2100	2100	2100
Doors									
Unit doors	1	1	1	1	1	2	2	2	3
Internal Dimensions									
Width [mm]	450	500	500	600	600	1090	1340	1300	2090
Depth [mm]	540	480	580	570	670	580	570	670	670
Height [mm]	520.5	1257	1257	1340	1340	1257	1350	1340	1340
Measures									
Interior net volume [L]	130	310	370	450	530	810	1020	1180	1830
Net weight of the unit (empty) [kg]	8	100	110	132	167	197	212	215	367
Permitted load per rack [kg]	20	20	20	20	20	20	20	20	20
*3Fixtures									
Number of shelves (std./max.)	2/3	3/5	3/5	3/6	3/6	6/10	6/12	6/12	9/14
Shelf Width [mm]	400	460	460	530	530	460	530	530	530
Shelf Depth [mm]	500	470	570	550	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								

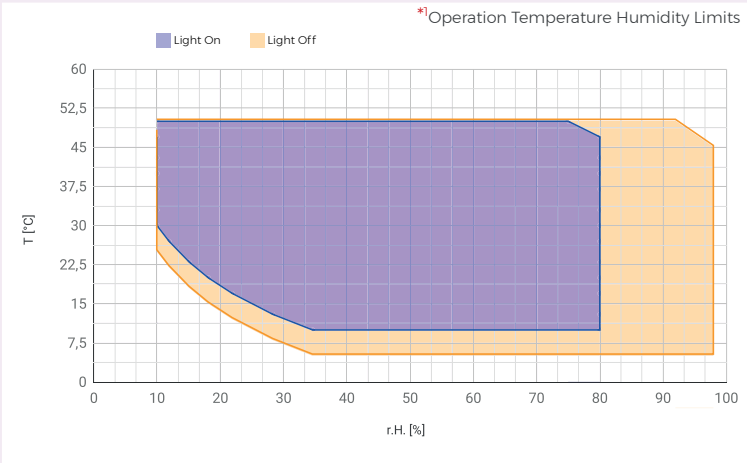
^{*2}The cartridge should be change every 4÷6 months at most.

^{*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 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.

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

	FDML-130	FDML-310	FDML-370	FDML-450	FDML-530	FDML-810	FDML-1020	FDML-1180	FDML-1830	
Positive Range (S)	140S	370S	440S	600S	700S	900S	1200S	1500S	2300S	
Negative Range (B)	140B	370B	440B	600B	700B	900B	1200B	1500B	2300B	
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									
*4Nominal power [kW]	Light off (S)	1.4	1.5	1.4	1.8	1.8	2.2	2.4	2.6	4.1
	Light off (B)	1.6	1.7	1.7	2.2	2.3	2.6	2.7	2.9	4.7
Unit fuse [A]	16									
Phase (nominal voltage)	1 ~									

Charts



Main Options

- **MINI T-RH** - Temperature/humidity Datalogger
- **UDB100** - USB port for storage data
- **ETH100** - Ethernet interface for remote connection
- **SND20T** - Additional temperature sensor (Pt 100)
- **SND80H** - Additional humidity sensor
- **ASW00** - Water filtration system
- **BDS020** - Relative humidity decreasing up to 2% @ 20°C
- **CO200** - CO2 Regulation System for EN 12390-10
- **PE100** - Interior socket coverable universal 220-230 V
- **IR000** - Interior neon lighting
- **IR000LED** - Interior LED lighting
- **IS200** - Dimmable adjusting light for individual lamp
- **FP100** - Photoperiod 24h control
- **IR000LED** - Interior LED lighting
- **GD100** - Glass door
- **SP100** - Internal compartments lexan door
- **GW100** - Phorthole with anti-fogging glass (Ispection window)
- **UMS100** - Sterilised flux vapor humidifier
- **SPS07** - Pools system for EN1348-2007
- **PAC00** - Wooden crate packaging
- **PAW00** - Wooden boxes packaging
- **RT100** - Castors kit
- **FD100** - Access cables port with plug
- **GP100** - Additional rack
- **GP100R** - Additional reinforced rack
- **TE110** - Power supply 110 V 50-60 Hz

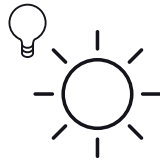
*4The nominal power with light ON varies, depending on the number and types of lamps installed.

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



FDM - ENVIRONMENT MAKERS
Technical specifications are subject to change

Daylamp



Sunlight Simulation

	FDML-130	FDML-310	FDML-370	FDML-450	FDML-530	FDML-810	FDML-1020	FDML-1180	FDML-1830
Positive Range (S)	LDC140S	LDC370S	LDC440S	LDC600S	LDC700S	LDC900S	LDC1200S	LDC1500S	LDC2300S
Negative Range (B)	LDC140B	LDC370B	LDC440B	LDC600B	LDC700B	LDC900B	LDC1200B	LDC1500B	LDC2300B
*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	39	47	43	47	47	47
Illumination on Shelf [LUX]	10.500	13.000	13.000	12.000	16.000	13.000	16.000	16.000	16.000
*7Vertical Walls Illumination									
Lateral inner walls illumination [LUX]	10.000	12.000	15.000	15.000	18.000	15.000	15.000	18.000	18.000
Spectrum diagram lamp									

*5 This data are specified with Fluorescent Lamps. With LED lamps installed the lux values could vary by $\pm 10\%$. 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 $\leq 3 \pm \% \text{ RH}$

Fluolamp



Plant Growth Acceleration

	FDML-130	FDML-310	FDML-370	FDML-450	FDML-530	FDML-810	FDML-1020	FDML-1180	FDML-1830
Positive Range (S)	LFC140S	LFC370S	LFC440S	LFC600S	LFC700S	LFC900S	LFC1200S	LFC1500S	LFC2300S
Negative Range (B)	LFC140B	LFC370B	LFC440B	LFC600B	LFC700B	LFC900B	LFC1200B	LFC1500B	LFC2300B
*5 Temperature performance Light on									
At 0% light [°C]	(S)					0...+55			
	(B)					-10...+55			
At 100% light [°C]	(S)					5...+50			
	(B)					-5...+50			
*6 Horizontal Shelf Illumination									
Illumination on Shelf [W/m ²]	45	52	43	39	47	43	47	47	47
Illumination on Shelf [LUX]	4.500	4.500	5.000	5.000	6.500	5.000	6.500	6.500	6.500
PPFD [μmol/m2s]	150	150	170	170	230	170	230	230	230
*7 Vertical Walls Illumination									
Lateral inner walls illumination [LUX]	4.000	5.000	6.000	6.000	7.000	6.000	6.000	7.000	7.000
PPFD [μmol/m2s]	120	150	190	190	220	190	190	220	220
Spectrum diagram lamp									

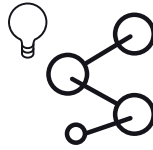
*5 This data are specified with Fluorescent Lamps. With LED lamps installed the lux and PPFD values could vary by $\pm 10\%$. The W/m² decrease around 20%.

*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.

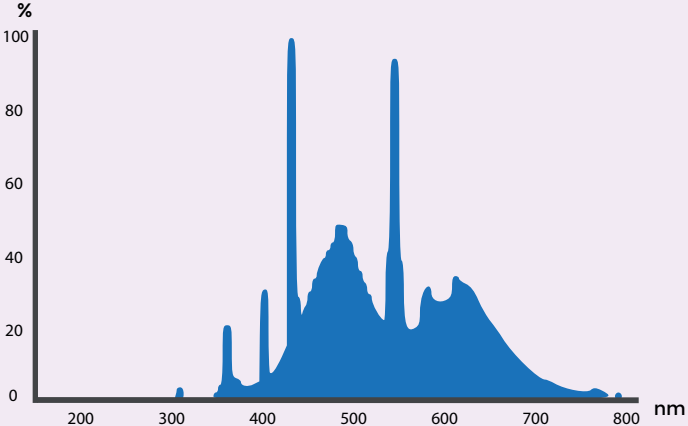
*7 The installation of fluorescent walls illumination reduces the useful width of the shelves: for 140,370,440,900 liters size is reduced of 160 mm for 600, 700, 1200, 1500 liters volume size is reduced of 100 mm. The led walls illumination reduces the useful width of the shelves: for 370, 440, 900 liters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

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

Biolamp



Insect and Bacteria incubation

	FDML-130	FDML-310	FDML-370	FDML-450	FDML-530	FDML-810	FDML-1020	FDML-1180	FDML-1830
Positive Range (S)	LBC140S	LBC370S	LBC440S	LBC600S	LBC700S	LBC900S	LBC1200S	LBC1500S	LBC2300S
Negative Range (B)	LBC140B	LBC370B	LBC440B	LBC600B	LBC700B	LBC900B	LBC1200B	LBC1500B	LBC2300B
*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]	x	x	x	x	47	x	47	47	47
Illumination on Shelf [LUX]	x	x	x	x	12.000	x	12.000	12.000	12.000
*7Vertical Walls Illumination									
Lateral inner walls illumination [LUX]	7.000	8.000	10.000	10.000	13.000	10.000	10.000	13.000	13.000
Spectrum diagram lamp									

x = not available

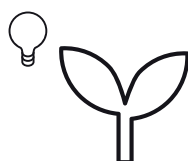
*5 This data are specified with Fluorescent Lamps. With LED lamps installed the lux values could vary by $\pm 10\%$. The W/m² decrease around 20%.

*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.

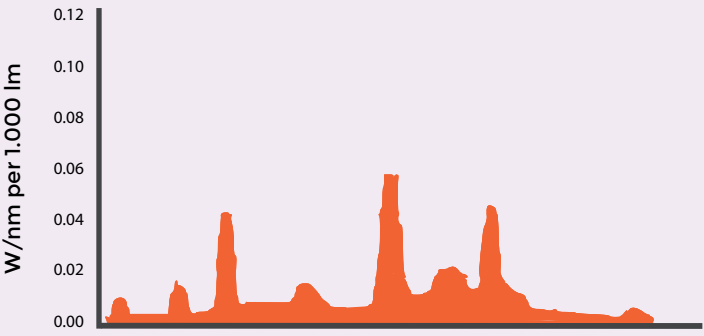
*7 The installation of fluorescent walls illumination reduces the useful width of the shelves: for 140, 370, 440, 900 liters size is reduced of 160 mm for 600, 700, 1200, 1500 liters volume size is reduced of 100 mm. The led walls illumination reduces the useful width of the shelves: for 370, 440, 900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

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

Arablamp



Arabidopsis Growth Acceleration

	FDML-130	FDML-310	FDML-370	FDML-450	FDML-530	FDML-810	FDML-1020	FDML-1180	FDML-1830
Positive Range (S)	LAC140S	LAC370S	LAC440S	LAC600S	LAC700S	LAC900S	LAC1200S	LAC1500S	LAC2300S
Negative Range (B)	LAC140B	LAC370B	LAC440B	LAC600B	LAC700B	LAC900B	LAC1200B	LAC1500B	LAC2300B
*5 Temperature performance Light on									
At 0% light [°C]	(S)					0...+55			
	(B)					-10...+55			
At 100% light [°C]	(S)					5...+50			
	(B)					-5...+50			
*6 Horizontal Shelf Illumination									
Illumination on Shelf [W/m²]	x	x	x	x	44	x	44	44	44
Illumination on Shelf [LUX]	x	x	x	x	12.000	x	12.000	12.000	12.000
PPFD [µmol/m2s]	x	x	x	x	440	x	440	440	440
*7 Vertical Walls Illumination									
Lateral inner walls illumination [LUX]	8.000	10.000	12.000	12.000	14.000	12.000	12.000	14.000	14.000
PPFD [µmol/m2s]	230	280	350	350	420	350	350	420	420
Spectrum diagram lamp	<div><div>W</div><div>0.12</div><div>0.10</div><div>0.08</div><div>0.06</div><div>0.04</div><div>0.02</div><div>0.00</div><div>W/nm per 1.000 lm</div><div>350</div><div>400</div><div>450</div><div>500</div><div>550</div><div>600</div><div>650</div><div>700</div><div>750</div><div>nm</div><div></div></div>								

x = not available

*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

ICHlamp



Photostability Test

	FDML-130	FDML-310	FDML-370	FDML-450	FDML-530	FDML-810	FDML-1020	FDML-1180	FDML-1830
Positive Range (S)	LHT140S	LHT370S	LHT440S	LHT600S	LHT700S	LHT900S	LHT1200S	LHT1500S	LHT2300S
*5 Temperature performance Light on									
At 0% light [°C] (S)					0...+55				
At 100% light [°C] (S)					5...+50				
*6 Horizontal Shelf Illumination									
Illumination on Shelf for UV-A lamps [W/m ²]	130	140	110	100	100	110	100	100	100
Illumination on Shelf for White lamps [LUX]	8.000	8.000	10.000	10.000	13.000	10.000	13.000	13.000	13.000
Exposition time to reach 1,2 million of lux [Hours]	153	157	118	122	92	118	92	92	92
Exposition time to reach 200 W/m ² of UV-A [Hours]	1,3	1,4	1,7	1,9	1,9	1,7	1,9	1,9	1,9

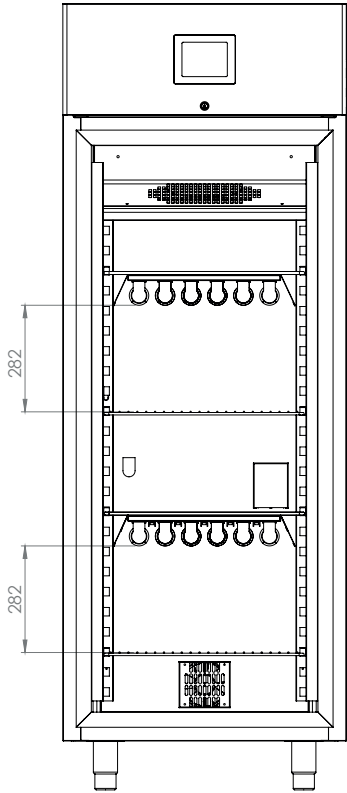
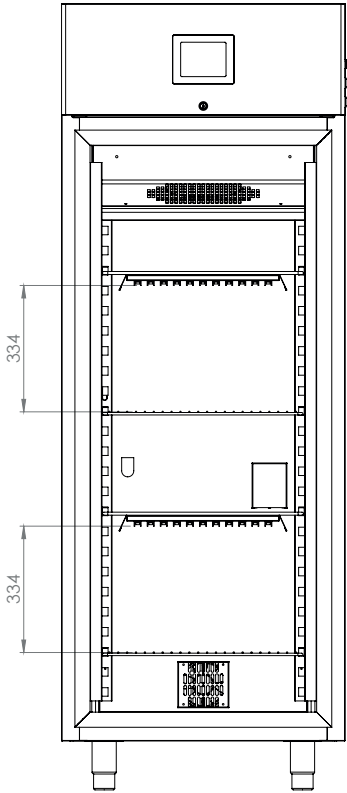
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Ferdinand-Porsche-Str. 2, 63073 Offenbach - Germany

*5 This data are specified with Fluorescent Lamps. With LED lamps installed the lux values could vary by $\pm 10\%$. 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.

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

	Chamber 700 liters chawith <i>FLUORESCENT lamp</i>	Chamber 700 liters with <i>LED lamp</i>
		
Vertical Walls lamp	