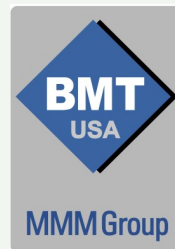


FRIOCELL CLIMACELL



Stability, Growth Chambers & Incubators



Heating

Cooling

Lighting

Humidity

**Testing of ...
Stability,
Photo-stability &
Plant growth ...**

FRIOCELL

with forced air convection and cooling

The high technical standard of the Friocell Incubator allows exact incubation processes while maintaining precise temperature control both for variation and deviation. The units have very short recovery times and together with fuzzy logic control ensure there is no temperature overshoot during heating. The unique cooling system ensures that samples are not dried while cooling. The units can be equipped with high performance lighting for both plant growth and testing of products. Ideal for use in biological laboratories, botany, cosmetics, the food processing and chemical industries.



Comfort Control

All BMT Friocell and Climacell Incubators are equipped with the most advanced Microprocessor control system available. Standard features include:

- Unique chip card system for unlimited and individual program storage
- RS 232 port for printer and PC communications
- Programmable start and stop time functions
- Acoustic and visual alarm notification
- Programmable cycle range from 1 min to 40 years with 1 min intervals
- Digital class III safety thermostat
- Real time cycle data
- Temperature ramping of increase or decrease
- Programmable cycle steps
- 6 programmable cycles on controller and unlimited programmable cycles with chip cards
- Adjustable fan speed
- Adjustable damper (exhaust rate) from 10% to 100%
- Password protection
- Door open alarm

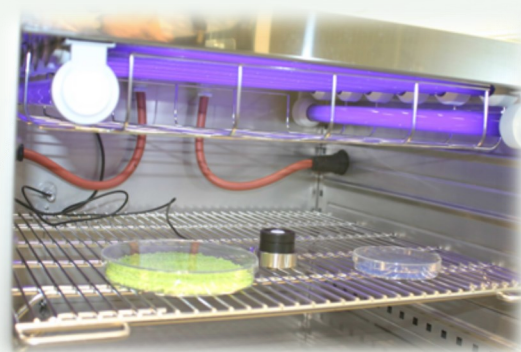
CLIMACELL

with forced air convection, cooling and controlled humidity

BMT Incubators' principle of operation is based on a precise forced air circulation combined with a patented powerful cooling system and a humidifier situated in the chamber. A multiprocessor humidifying and dehumidifying control system together with an optional lighting system ensure perfect homogenous conditions for precise simulation of climatic conditions. BMT Incubators with heating, cooling and humidity control are specifically designed for applications in which exact and reproducible simulation of various environmental conditions are important such as stability testing of components,

Options

- Cooling to -9.9 C (Climacell with unregulated humidity only)
- Internal lighting in a wide range of various light sources and can be equipped under shelves or in the door (not available in sizes 22 liters and 55 liters)
- Access ports with the diameter of 25 and 50 mm and up to 100 mm in chamber sizes above 22 liters
- Electronic door locks
- Electric socket (water proof) inside chamber for instruments
- Programmable lighting simulating day/night, digital adjustable from 10% to 100%
- Optional wave length of light sources available
- Lighting under shelves for photo stability tests according to ICH Q1B Guidelines
- UV, VIS illumination measuring instruments
- Building maintenance alarm monitoring relays
- Independent flexible temperature monitoring (RTD) device inside the chamber
- WarmComm software for central monitoring and control of up to 10 different BMT incubators
- Stainless steel exterior for superior aesthetics and clean ability
- Heated door for reduced condensation build up



Incubators designed for testing of stability, photostability and experimental growth of plants ...

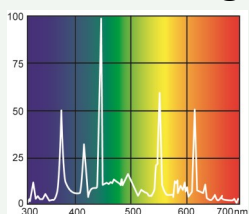
The units are designed in accordance with EU 2006 / 95/EC, 2004/108/EC. These chambers also meet the highest requirements for photostability tests, according to the ICH guidelines Q1B, option 2 and the European norms. Cultivating and testing chambers, FRIOCELL and CLIMACELL can be equipped with exposure lights to create optimal conditions for plant growth and cultivating of tissue cultures under natural conditions. The excellent microprocessor enables easy programming and offers a wide range of parameters for simulation of day and night adjustments of air circulation, humidity and lighting.

- Wide range of chamber volumes from 22 up to 707 liters
- Various light sources for different purposes
- Fully programmable intensity of the light – microprocessor controlled (0–100%, increments 10%)
- Optional UV or VISIBLE light on-line measurement with data evaluation (display / printer / PC)
- High temperature and humidity uniformity due to patented double jacket vertical ventilation system
- Reflective surfaces in lighting modules made of stainless steel for higher efficiency of lighting
- Elimination of condensation in chamber due to patented efficient airflow system
- Flexible position of the lighting and shelving
- Vertical construction of the chamber saves space in the laboratory
- Automatic defrost for long-term processes at lower temperatures

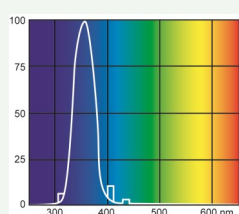
FRIOCELL - CLIMACELL - LIGHTING SHELVES: VISIBLE & UV TUBES				
Chamber volume (l) / ft ³	111 / 3.92	222 / 7.84	404 / 14.27	707 / 25
width × depth × high of shelf [mm]	539 × 350 × 90 / 21.2 × 13.8 × 3.5	539 × 500 × 123 / 21.2 × 19.7 × 4.8	539 × 500 × 123 / 21.2 ×	939 × 512 × 93 / 37 × 20.2 × 3.7
No. of tubes/each shelf [pcs]	5	8	8	12
Max. no of shelves/unit [pcs]	2	2	3	3
Power input/W/each shelf [W]	75	120	120	180
Length/diameter of tube [mm]	450 / 26	450 / 26	450 / 26	450 / 26
Visible source				
VIS sources 400-700 [nm]	2700 / 3000	2700 / 3000	2700 / 3000	2700 / 3000
Color temperature [°K]	4000 / 6000	4000 / 6000	4000 / 6000	4000 / 6000
Tube type / power input/ each	Luxline Plus / 15 [W]			
Light intensity in the middle of shelf ± 10 Distance of light source 12 cm	16.5	18	18	20
UV source				
UV source - range - [nm] peak at / nm	300–400, max. 350	300–400, max. 350	300–400, max. 350	300–400, max. 350
Tube type / power - input / each	Black Light Blue / 15 [W]			
Light intensity in the middle of shelf ± 10 % [mW/cm				
Distance of light source 12 cm	5	5	5	5
Temperature range °C with lights on and non-controlled humidity / Temperature range °C with lights on and controlled humidity / Range of RH [%] with lights on (temperature				
1 shelf	0–99.9 / 10–90 / 10–75	0–99.9 / 10–90 / 10–75	0–99.9 / 10–90 / 10–85	0–99.9 / 10–90 / 10–85
2 shelves	15–99.9 / 17–90 / 10–60	15–99.9 / 15–90 / 10–60	– / – / –	– / – / –
3 shelves	– / – / –	– / – / –	8–99.9 / 15–90 / 10–60	8–99.9 / 15–90 / 10–60
Temperature range °C with lights on and non-controlled / controlled hu-				
	0–99.9 / 10–90	0–99.9 / 10–90	0–99.9 / 10–90	0–99.9 / 10–90
Range of controlled RH [%] with lights off	10–90	10–90	10–90	10–90
Protective system	IP 65	IP 65	IP 65	IP 65
Connectors no. / each shelves [pcs]	2	2	2	2

All technical parameters are based on an empty chamber (without samples on shelves), 20–22 °C ambient temperature, ventilator / fan speed 100 %, defrost off, lighting off, supply voltage 230 V + 10 %. Range of the humidity control is limited according to the data in the user manual for CLIMACELL. The real photometry-values are necessary to measure during the test with an independent measurement device. Our products FRIOCELL and CLIMACELL fulfill all demands (temperature accuracy/temperature uniformity, range, accuracy, light intensity and spectrum range) for all stability and foto stability testing according to the internationally valid European norms and the pharmaceutical ICH guidelines Q1A R (except point 2.2.7.5 – storage in freezer – and point 2.2.7.6 – storage below minus 20 °C) and ICH Q 1 B, option 2.

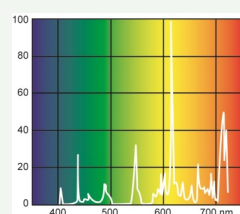
Available Light Sources



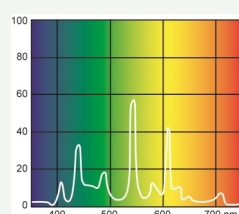
Activa— Full Spectrum light



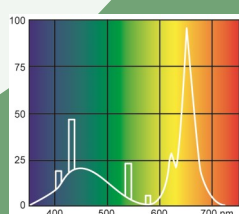
Black light Blue



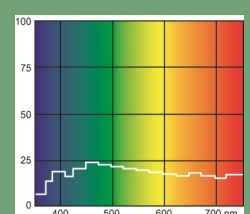
Cool White 840



Day light 860



Gro-Lux— Increased blue 7
red share - support of photobiological plants processes



Normal Day light

FRIOCELL (FC) 22l, 55l, 111l, 222l, 404l, 707l CLIMACELL (CLC) 111l, 222l, 404l, 707l

Technical data	volume	cca mm / ft 3	22***/.77	55***/1.94	111 / 3.92	222 / 7.84	404 / 14.26	707 / 25
Inner dimensions	width	cca mm / in.	244 / 9.6	400 / 15.8	540 / 21.25	540 / 21.25	540 / 21.25	940 / 37
	depth	cca mm / in.	307 / 12.1	370 / 14.6	370 / 14.6	520 / 20.5	520 / 20.5	520 / 20.5
Chamber, stainless steel	height	cca mm / in.	296 / 11.7	350 / 13.8	530 / 20.9	760 / 29.9	1410 / 55.6	1410 / 55.6
	Volume of the steam space cca	cca l / ft3	43 / 1.5	89 / 3.1	163 / 5.8	299 / 10.6	524 / 18.5	876 / 31
Tray stainless steel *)	racks	max. No.	4	4	7	10	19	19
	standard equipment	pcs. included	2	2	2	2	2	2
	min. distance between trays	cm / inches	6 / 2.4	7 / 2.8	7 / 2.8	7 / 2.8	7 / 2.8	7 / 2.8
Maximum weight of the load *)	per tray	max. kg/tray	10/22	20/44	20/44	30/66.1	30/66.1	50/101.2
	inside the oven	max. kg./rack	25 / 55.1	50 / 110.2	50 / 110.2	70 / 154.3	100 / 220.5	130 / 286.6
Door	no. of outer metal doors	No.	1	1	1	1	1	1
	no. of inner glass doors	No.	1	1	1	1	1	1
External dimensions FC (including door and handle)	width	cca mm / in.	406 / 15	620/24.4	760 / 30	760 / 30	1010 / 39.8	1460 / 57.5
	depth	cca mm / in.	592 / 23.3	640/25.2	640 / 25.2	790 / 31.1	790 / 31.1	790 / 31.1
	height	cca mm / in.	605 / 23.8	820 / 32.3	1000 / 39.4	1230 / 48.5	1910 / 75.3	1910 / 75.3
External dimensions CLC (including door and handle)	width	cca mm / in.			760 / 30	760 / 30	1010 / 39.8	1460 / 57.5
	depth	cca mm / in.			640 / 25.2	790 / 31.1	790 / 31.1	790 / 31.1
	height	cca mm / in.			1100 / 43.3	1330 / 52.4	1910 / 75.3	1910 / 75.3
Weight Friocell	net	cca kg / lbs	33 / 72.8	80 / 176.4	101 / 222.7	132 / 291	230 / 507	270 / 595.2
	gross (with packaging)	cca kg / lbs	38 / 83.8	99 / 218.3	131 / 288.8	169 / 372.6	270 / 696.2	316 / 696.7
Weight Climacell	net	cca kg / lbs			101 / 222.7	132 / 291	230 / 507	270 / 595.2
	gross (with packaging)	cca kg / lbs			131 / 288.8	169 / 372.6	270 / 696.2	316 / 696.7
Electricity	max. power**) FC	W	100	1130	1130	1130	2250	2500
	max. power**) CLC	V			2050	2100	3150	3400
	main 50/60 Hz		100-240	230	230	230	230	230
	protective system		IP 20	IP 20	IP 20	IP 20	IP 20	IP 20
Temperature data								
Working temperature	at ambient temperature 22 °C °C		+5-+70			(-9.9)*** 0 - +99.9		
Temperature uniformity	at 10 °C accuracy	cca (±) °C	<0.3	<0.5	<0.5	<0.5	<1	<0.1
	at 37 °C	cca (±) °C	<0.3	<0.5	<0.5	<0.5	<1	<0.1
	in time	cca (±) °C	<0.1	<0.2	<0.2	<0.2	<0.3	<0.4
Heating up time to 37 °C from the ambient temperature		min	10	23	20	25	26	27
Cooling down time from 22 °C to 10 °C		min	<31	<14	<21	<21	<21	<21
Recovery time after 30 sec. door open according DIN 12 880 FC / CLC	FC / CLC	at 37 °C	1/-	1/-	1.5/1.5	1.5/1.5	1.5/1.5	1.5/1.5
		at 50 °C	2.5/-	1.5/-	2/2	3(2.5)/2.5	5/5.5	3.5/3/5
Relative humidity CLC	range	%			10 - 90%	10-90%	10-90%	10-90%
Heat emission	at 37 °C	cca W	50	62	70	97	123	148
Noise level - complete incubator		dB	53	46	46	50	56	58

Note: All technical data is related to 22 °C ambient temperature and ± 10 % voltage swing (if not specified). For other parameters see section Electric connections. There occurs temperature and humidity variation in case of regular turbidity removal during the operation.

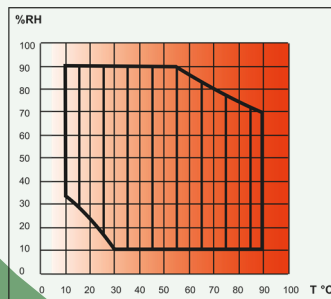
* Approx. 50 % of the tray area can be filled in order to enable uniform air circulation inside the chamber.

** Compressor + condenser + electromagnetic valves + fan / ventilator (s) + steam generator heating (volume 22 liters with Peltier model)

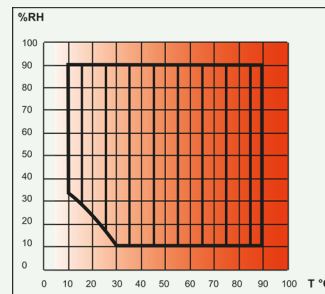
*** Volume 22 and 55 liters without internal lighting

**** on request

Setting operating conditions of temperature and relative humidity and their limitations



Unit with-out lighting



Unit with lighting in doors

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