



# Friocell *Eco*



Patented Forced Air Convection

Biochemical Oxygen Demand (BOD) & Cooling Incubators



FRIOCELL® BOD incubators employ a patented forced air convection system that moves air vertically and horizontally inside the chamber to produce precise temperature uniformity, ideal for biochemical oxygen demand (BOD) testing applications. Microprocessor controls ensure accurate temperatures without overshooting the set point and allow for flexible and repeatable cycles for reproducible test conditions. FRIOCELL® BOD incubators are FDA CFR 21 Part 11 compliant when equipped with Warmcomm 4.0F software.



Biochemical Oxygen Demand (BOD) testing of water samples



ICH Q1A stability & ICH Q1B photostability testing of pharmaceutical, biotech, and cosmetic devices, products & substances



Bacterial culturing and tissue culture growth



## ECO Controller

3" LCD display

Fuzzy Logic algorithm constantly monitors chamber conditions and continuously optimizes parameters.

(9) programs with (2) segments each for varying loads and parameters

Audible & visual alarms – temperature, time & humidity

FDA CFR 21 Part 11 compliant with addition of Warmcomm 4.0F software

USB flash & device, RS232 & optional Ethernet port

Integrated USB 30-day data logger included with 111, 222, 404, 707, and 1212 models

## Temperature Range:

0°C up to 100°C (-10°C min. temperature option available)

## Patented Air Flow Control:

Controlled in 1% increments

## Chamber Volumes:

22 (.8 ft<sup>3</sup>) • 55 (2 ft<sup>3</sup>) • 111 (4 ft<sup>3</sup>) • 222 (8 ft<sup>3</sup>) • 404 (14.3 ft<sup>3</sup>) • 707 (25 ft<sup>3</sup>) • 1212 (43 ft<sup>3</sup>)

## Chamber Construction:

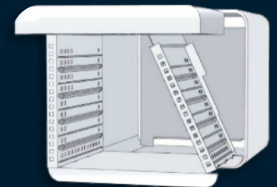
- AISI 304 stainless steel chamber (AISI 316 SS option available)
- Double wall construction with 5 layers of insulation for more uniform internal chamber conditions

## Electrical Data:

115V 50/60Hz: 22, 55, 111, 222, 404, 707; 230V 50/60Hz: 1212

## Removable Inner Chamber:

- Elevated sterilization & cleaning standards with removable inner chamber.

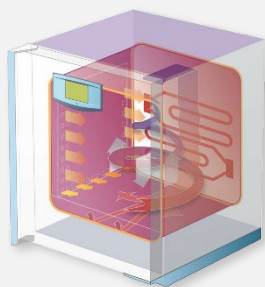


## Optional Equipment:

- ECO+ add 8 programming segments
- Access ports 25 (1"), 50 (2"), 100 (4") mm
- Ethernet communication port
- Rolling carts for 111 & 222 models
- Door sensor and alarm
- Automatic lock and key door lock
- Warmcomm data acquisition software:
  - ✓ 4.0B – Receive data
  - ✓ 4.0P – Receive data and control the device
  - ✓ 4.0F – FDA 21 CFR part 11 compliant
- BMS – Building monitoring alarm contact
- Flexible PT 100 sensor
- Stainless steel exterior
- 4-20mA & BMS contacts
- Socket 115V and 230V
- IQ / OQ protocols with 9pt or 27pt temperature mapping
- AISI 316 stainless steel chamber

Friocell ECO Technical Data		Model	55	111	222	404	707	1212
<b>Interior Dimensions</b>  <b>Chamber:</b> AISI 304 stainless steel (AISI 316 stainless steel option available)	Volume	ft <sup>3</sup>	1.9	3.9	7.8	14.3	25	43
		liters	55	111	222	404	707	1212
	Width	inches	15.7	21.25	21.25	21.25	37	3 x 21.25
		mm	400	540	540	540	940	3 x 540
	Depth	inches	14.6	14.6	20.5	20.5	20.5	20.5
		mm	370	370	520	520	520	520
	Height	inches	13.8	20.9	29.9	55.7	55.7	55.7
		mm	350	530	760	1415	1415	1415
<b>Exterior Dimensions</b>	Width	inches	24.4	29.9	29.9	41.7	57.5	92.9
		mm	620	760	760	1060	1460	2360
	Depth	inches	25.2	29.2	35.2	31.1	31.1	34.2
		mm	640	640	895	790	790	870
	Height (Legs L, Casters C)	inches	34.4L/37C	41.1L/46.7C	50.2L/57.1C	75L/35C	75L/35C	75L/75.6C
		mm	875L/940C	1045L/1187C	1275L/1450C	1905L/1890C	1905L/1890C	1905L/1921C
<b>Shelves: Stainless Steel</b>	Capacity: # of shelf guides in chamber side walls	Maximum #	4	7	10	19	19	3 x 19
		Standard #	2	2	2	2	2	6
<b>Shelf Distance</b>	Min. distance between trays	Inches	2.8	2.8	2.8	2.8	2.8	2.8
		mm	70	70	70	70	70	70
<b>Useable Shelf Area</b>	Width x Depth	Inches	15x13.2	20.5x13.2	20.5x19.1	20.5x19.1	36.3x19.1	20.5x19.1x3
		mm	380x335	520x335	520x485	520x485	920x485	520x485x3
<b>Maximum Shelf Load</b>	One Shelf	lbs	44.1	44.1	66.1	66.1	110.2	66.1
		kg	20	20	30	30	50	30
	Total Per Unit	lbs	110.2	110.2	154.3	220.5	286.6	661
		kg	50	50	70	100	130	300
<b># Outer Metal Doors</b>			1	1	1	1	2	3
<b># Inner Glass Doors</b>			1	1	1	1	2	3
<b>Volume of Steam Space</b>		ft <sup>3</sup>	3.1	5.8	10.6	18.5	30.9	61.9
		liters	89	163	299	524	876	1753
<b>Operation Temperature</b>	From 0°C (-10°C)	Up to °C	100	100	100	100	100	100/70
<b>Temperature Accuracy</b>	Distribution @ 10°C	± °C	<0.5	<0.5	<0.5	<1	<1	<0.6
	Distribution @ 37°C	± °C	<0.5	<0.5	<0.5	<1	<1	<0.5
	Uniformity	± °C	<0.2	<0.2	<0.2	<0.3	<0.4	<0.2
<b>Heating Time to 37°C From the Ambient Temperature</b>		Minutes	<11	<11	<11	<13	<13	<30
<b>Cooling Down Time From 22°C to 10°C</b>		Minutes	<21	<21	<17	<19	<21	<21
<b>Recovery time after door opened for 30 s according to DIN 12880</b>	@ 37°C	Minutes	<5	<5	<2	<2	<6	<10
	@ 50°C	Minutes	<6	<6	<3	<4	<6	<10
<b>Heat Emission</b>	@ 37°C	W	55	70	63	123	148	200
<b>Noise Level of Complete Device</b>		dB	45	46	50	56	58	60
<b>Electrical Data</b>	Max Consumption 50/60Hz	W	700	1000	1150	1700	2000	2500
		A	7.6	7.7	9.2	16	17.9	11.6
		V	115	115	115	115	115	230
<b>IP Code</b>			IP20	IP20	IP20	IP20	IP20	IP20
<b>ECO Weight</b>	Net	lbs	183	233.7	302	493.8	562.2	1144.2
		kg	83	106	137	224	255	519
	Gross	lbs	224.9	299.8	383.6	606.3	707.7	1849.7
		kg	102	136	174	275	321	839

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#### Patented Forced Air Convection

BMT's patented force air convection system moves air vertically and horizontally inside the chamber for precise temperature uniformity and fast heating and cooling times. The process of heating from the bottom of the chamber to the top mimics natural airflow, allowing for more precise simulation of climatic conditions.