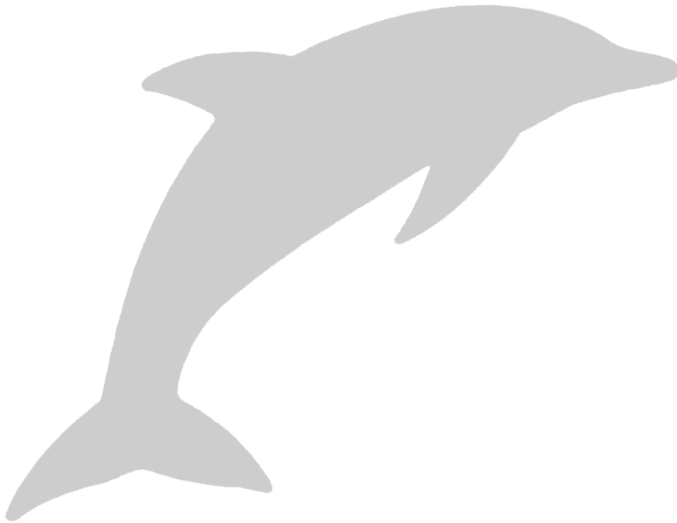


# 2 Liter Bench-Top Fermenter

Product Information and Instructions  
January 2000

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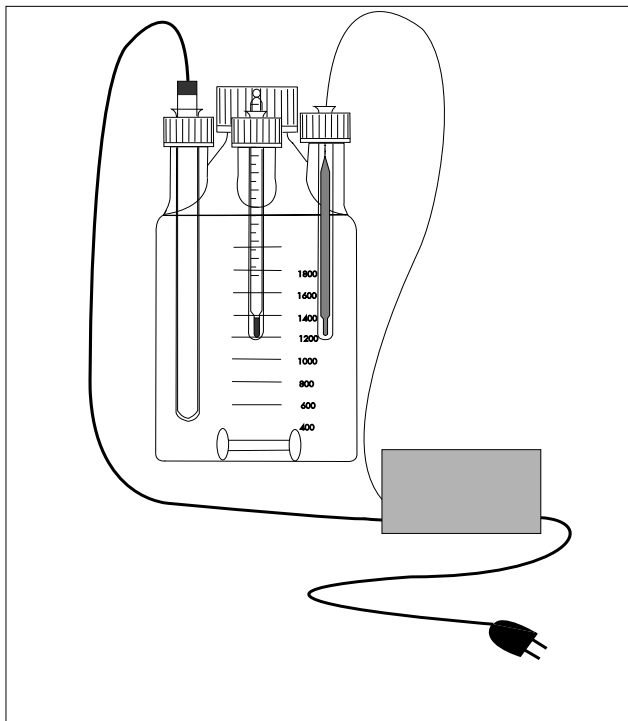
# 2 Liter Bench-Top Fermenter

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## 1. General Description

Our fermenter unit is designed for easy bench-top handling. It is simple to use and combines practical aspects with low costs. The fermenter unit has a capacity of 1 to 2 litres.

Heating is provided by a strong (100 W) heating element controlled by a calibrated relay connected to a high-quality platinum thermocouple. This allows precise temperature regulation ( $\pm 0.5^{\circ}\text{C}$ ). A variable control pump delivers air to the bubbler. For special gas mixtures, connections to cylinders are also possible. Each unit has a series of ports. Every port is sealed by a heavy duty screw top and a silicone washer. The units contain 2 air filters (one for inflow complete with silicone tubing, one for outflow) and a thermometer for direct temperature measurement. A large magnetic stirrer bar is included as well as long (10 cm) needles for taking samples through septa. The unit fits into even the smallest of upright autoclaves. The fermenter is delivered completely. All replacement parts are available separately.



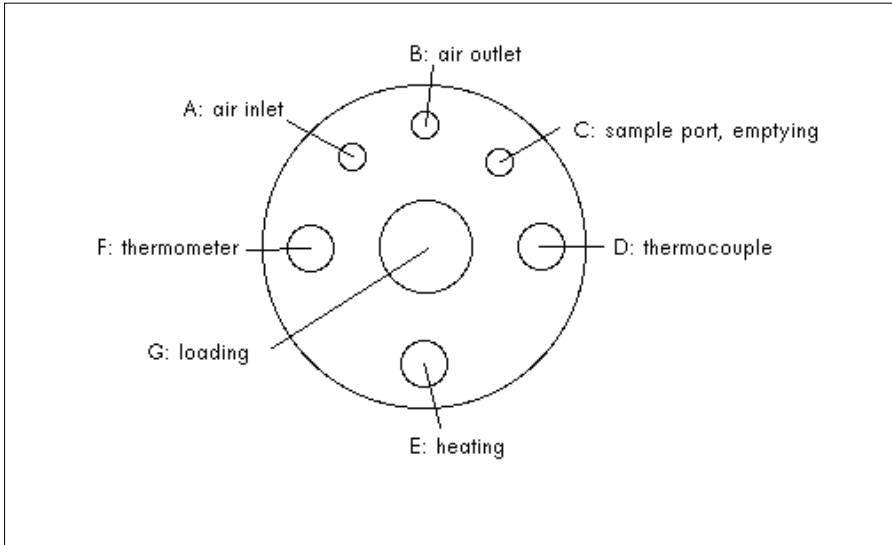
The 2 I Fermenter

## 2. Directions for Use

Fill the air filters with cotton wool. Mount the bubbler (this can also be autoclaved separately, with filter) in port B. The outlet filter is fitted in port A and port C closed with a septum. Insert the three test tubes into ports D, E and F. Port G can be used for your pH-meter electrode, if desired. Fill the fermenter with medium through port G. Also add 1 to 2 drops antifoam (e.g. Sigma #A-5551 antifoam 289). If needed, the pre-weighed powder can be introduced by port G and water poured into the appropriate extent (volume graduations on the fermenter body). Close port G. The unit is then ready to be autoclaved.

## Mo Bi Tec

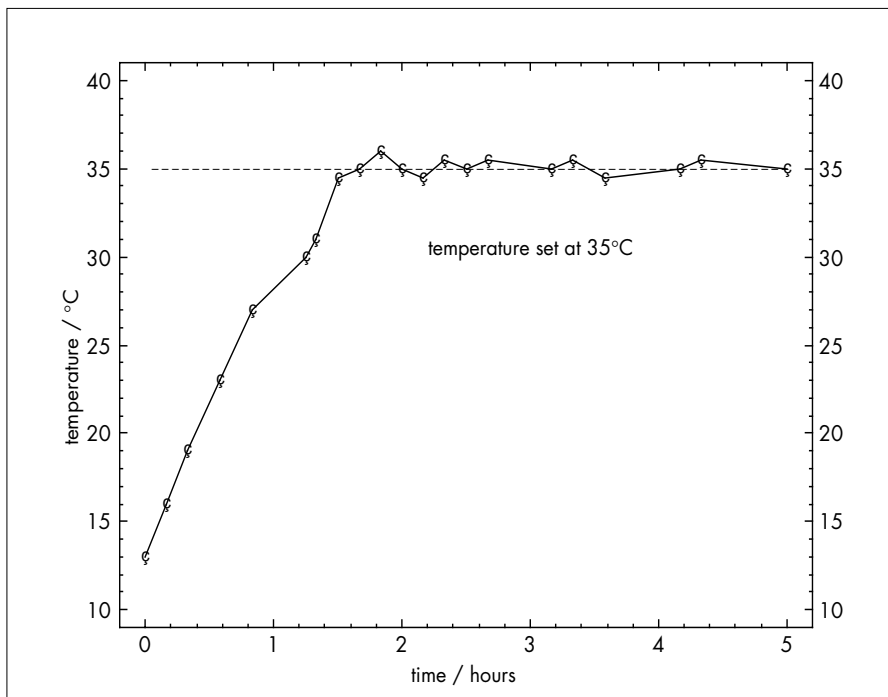
Important: The silicone washers must lie flat under the screw taps, otherwise leaks and damage to the glass screw may occur.



Top view of the fermenter

When sterile, insert the thermometer into the test tube in port F and the thermocouple into port D (it must touch the bottom of the test tube). Insert the heating element into port E. Unscrew the waterproof lid of the relay unit and set the dial to the working temperature. Plug-in the relay. Switch on the green „on“ switch (this will light up) and pre-incubate until the desired temperature is reached, adjust the dial if necessary. Screw the top back onto the relay. If the bubbler was autoclaved separately, then insert it into port B. Connect the tubing to the air pump and plug this in. The pump can be regulated by turning the white knob close to the air outlet. Place the fermenter on a magnetic stirrer, switch it on and adjust it to the desired stirring rate. The starter culture (and non-autoclavable media components, e.g. vitamins, antibiotica etc.) are introduced

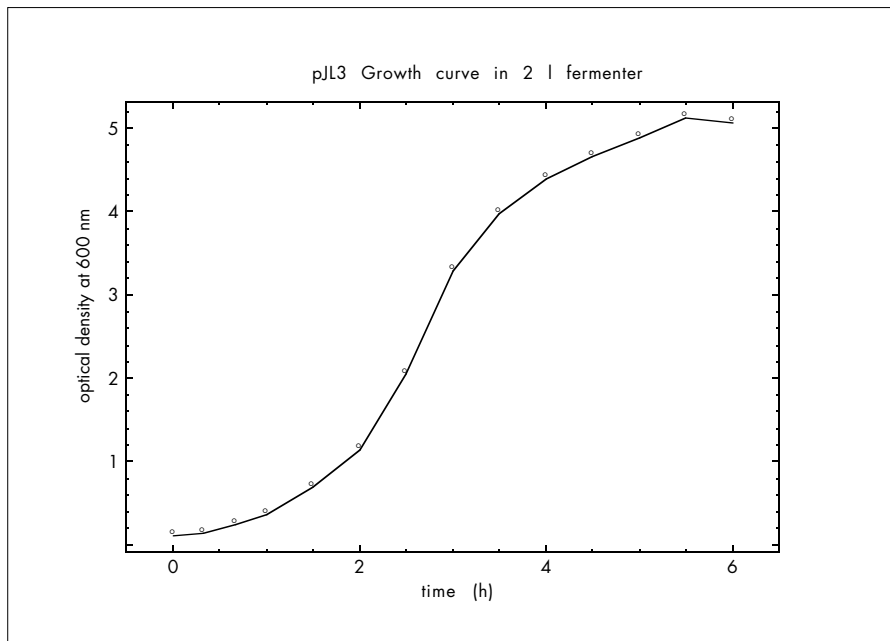
through port C as follows: Wet the septum with 70 % ethanol and introduce the culture with hypodermic syringe and needle. This process can be repeated throughout the incubation to take samples, using the extra-long needles provided. When the desired state of growth has been reached, remove all external elements from the fermenter (heater, thermocouple, thermometer etc.)



Temperature curve of the medium within the fermenter

and unplug the relay and pump. Unscrew port C and pour out the cells. Starting from cold, a temperature overshoot of about 1°C is normal. The temperature control unit will keep the temperature (between 40°C and room temperature) with an accuracy of about  $\pm 0.5^{\circ}\text{C}$ . For increased sensitivity, pour clean water into tubes D and F (thermocouple and thermometer).

## 4. Growth Curve



Growth ( $OD_{600}$ ) of *E. coli* (N3406; pJL3) cells in YT medium (with chloramphenicol) including antifoam at 37 °C. Two litre fermenter with 20 ml starter culture. Samples measured at appropriate dilutions.

## 3. Cleaning

Use a mild detergent in warm water. For deposits in the fermenter body (for example from filamentous cyanobacteria, etc.) we suggest soaking in 3 M HCl. Rinse well with distilled water.

5. Content "Fermenter Complete System"

2l	fermenter body
1	relay unit (0 - 40°C) containing Pt thermocouple and heating element
1	air pump
1m	silicon-tubing (6 x 9 mm)
10	long needles
1	bubbler (Ø 10 mm)
1	air outlet
1	glass capillary (od: 8.2 mm id: 2 mm)
2	air sterile filters (hydrophobe)
1	thermometer (50°C alc)
1	magnetic bar (55 mm)
1	screw cap GL 45
3	screw caps GL 25 (in. ø 16 mm)
3	screw caps GL 18 (in. ø 11 mm)
2	tubing clamps

		outer diameter mm	inner diameter mm	length mm
1	glass tube	14	12	ca. 200
1	glass tube	10	8	ca. 200
1	glass tube	9	7	ca. 200

1	septum	42	
2	septa	22	
2	septa	17	
1	washer	22	13
1	washer	22	10
1	washer	22	8
3	washers	17	8

## **6. Order Information**

**F0102** Fermenter Complete System

Replacement parts:

**F0201** Replacement kit heating  
Relay unit, heating element,  
Pt thermocouple, plug and cable

**F0202** Replacement kit accessories  
1 m tubing, magnetic bar,  
10 long needles, 8 assorted washers/septa,  
2 filter units

**F0203** Replacement Kit Body 2  
2 l fermenter body, thermometer,  
3 glass tubes, screw caps,  
washers and septa, bubbler

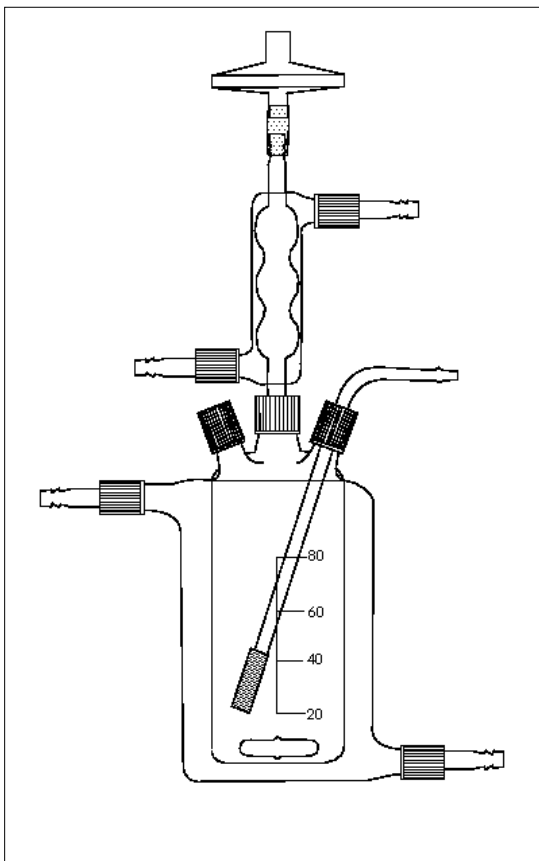
**F0204** Replacement Kit Pump  
air pump

**F0205** Sampling Hood (glass)



Also available at MoBiTec:

## **The 100 ml Fermenter**



Please contact us for further information.

## NOTE !

MoBiTec has improved the 2 l fermenter system:

### 1. Filter

The glass filters (to be filled with cotton) are replaced by air sterile filters.

materials	membrane: PTFE
	assembly: PP
filtration area	16 cm <sup>2</sup>
micron rating	0,2 µm
air flow rate	16 l/min; 200 mbar Dp
sterilisation	autoclavable up to 121°C

### 2. Taking samles

For taking samples you can use the delivered glass capillary. It prevents destruction of the cells.

Place the capillary in port C before autoclaving. Put a short piece of tubing at the end and close it with a tubing clamp.

For taking samples, open the capillary and close the air outlet for a few seconds. The air pressure will transport the cell suspension into the capillary.

### 3. Emptying

For emptying the fermenter you can also use a sampling hood offered by MoBiTec, order#: F0205