TC-3 load bioreactor

Description

The TC-3 Bioreactor has been designed as a simple easy-to-use system suitable to create cell culture experimental set-ups applying mechanical loading profiles defined by the user to the samples.

The needs of researchers working on cell culture under mechanical stimuli have been accounted for in the design of the TC-3. It combines the features of a traditional testing machine with the particular demands of cell culture, with special emphasis on the sterilization of the parts which are going to contact the culture medium, the easy assembling, the sample inspection by microscopy techniques and the straightforward sample manipulation.

Applications

The TC-3 permits to work with:

- Horizontally and vertically arranged multiple samples,
- Immersed and air-liquid interface setups,
- Sheet-shaped, rod-shaped and cylinder-shaped substrates,
- Tension and compression axial loading,
- Simultaneous tension/compression and flow through the substrate and
- Hydrostatic pressure

Visual inspection of the samples is provided thanks to its transparent lid and bottom glass window. Also when working with thin membrane-shaped scaffolds, it is possible to use **microscopy techniques to inspect the status of the culture in-situ**.

Scalability and versatility are key features of the TC-3, in which three grips models can be interchanged in order to adapt to the features of the testing substrate or scaffold.

The system is controlled by a simple computer interface which allows defining the most common loading profiles which can be applied on the culture substrate.

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TC-3 mechanical stimulation bioreactor	
Actuation system	
Dimensions [W x D x H]	• Vertical configuration: 285 x 478 x 110 mm • Horizontal configuration: 290 x 300 x 492 to 592 mm
Number of chambers	Up to three
Minimal displacement increment	0.005 mm
Maximal force	400 N
Control	PC-based control software
Power supply and consumption	110-220 V, 50-60 Hz, IEC 14 power cord
Maximal deformation rate	10 mm/s
Tension & Compression Chambers	
Autoclavable	Yes
External Dimensions [W x D xH]	78 x 137 x 51 mm
Internal Dimensions [W x D xH]	38 x 65 x 32 mm
Maximal internal volume [*]	~ 90 ml
• **Sheet-like grips**	
Autoclavable	Yes
Useful width	35 mm
Maximal displacement	31 mm
Minimal displacement	1 mm
• **Rod-like grips**	
Autoclavable	Yes
Useful width	30 mm
Maximal displacement	30.5 mm
Minimal displacement	0.5 mm
• **Compression grips**	
Autoclavable	Yes
Useful diameter	22 mm
Maximal displacement	30.5 mm
Minimal displacement	0.5 mm

[*]: This value is calculated without subtracting the volume occupied by the grips and the sealing bellow and considering that the chamber is filled to its full capacity. In a real experiment the culture media volume needed to fully cover the scaffold can be drastically smaller depending on the type of scaffold and the working configuration of the actuation system.

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Tension- Compression and flow Chamber	
Autoclavable	Yes
External Dimensions [W x D xH]	78 x 137 x 51 mm
Internal Dimensions [W x D xH]	38 x 65 x 32 mm
Maximal internal volume [*]	~ 90 ml
• **Tension-Flow grips for tubular scaffolds**	
Autoclavable	Yes
Scaffold diameter	1.65 to 6.35 mm
Maximal displacement	23 mm (for the 1/16” connector)
Minimal displacement	0 mm
• **Compression-Flow grips for porous scaffolds**	
Autoclavable	Yes
Maximal scaffold diameter	10, 13 and 18 mm
Maximal displacement	25 mm
Minimal displacement	0 mm
Hydrostatic pressure chamber	
Autoclavable	Yes
Internal dimensions [W x D x H]	40 x 45 x 46 [mm]
External dimensions [W x D x H]	80 x 130 x 83 [mm]
Volume	~ 80 [ml]
Maximal pressure	4 [bar]

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