A major effort has been invested to make bioreactors more efficient. To keep the cost of the MINIFOR fermentor low, without compromising quality, new ideas and innovations have been introduced:

**NEW STIRRING**

Instead of traditional impellers and expensive motors, we introduce a new vibration mixer. An electromagnet produces an efficient mixing without vortex formation, thus no baffles are needed.

At the same time this type of mixing is more gentle to cells and produces less foam. The oxygen transfer rate (OTR) is similar to traditional systems.

**CONTROL**

By using modern microprocessors it has been possible to place all the electronics into the front part of the apparatus. This makes the fermentor unbelievably compact and eliminates the casing tower commonly used in other products.

Despite its small size, six parameters are measured and controlled in the basic configuration of the fermentor-bioreactor. It takes minimum space on the bench and provides excellent access to all parts.

**STERILITY**

An inexpensive elastic membrane assures perfect sterility. It is easy to mount and replaces efficiently the need for mechanical seals or magnetic coupling.

**MATERIALS**

A glass vessel with threaded fittings is used instead of fermentor vessels with an expensive stainless steel cover.

As far as possible, expensive pieces of equipment have been replaced by new high performance plastics.

**GAS FLOW CONTROL**

MASSFLOW is a new mass flow controller system specially designed for the use together with laboratory bioreactors and fermentors. It allows the control of the pH of cell cultures by controlled addition of gaseous CO₂, nitrogen or of any other gas with a suitable controller.

However, it can also be used independently, since all functions can be accessed from the front panel of the MASSFLOW.

Massflow allows a precise, automatic control of the pH in cell cultures without the need of any other gas station.

**IR-HEATING**

The culture is heated by infrared (IR) radiation produced in a radiator with a gilded parabolic reflector placed under the fermentation vessel. The heat is absorbed gently by the culture in a similar way to the sun heating water.

There is no overheating of the culture at any volume, as is usually the case when a heater is placed in the medium. Expensive double wall vessels with thermostatic baths are eliminated. At the same time pipes and cables disappear making the fermentor less complex.

**PC SOFTWARE**

FNet is the easy to use software for the fermentation and cell culture monitoring with the Lambda MINIFOR Fermentor.

The software recognises the connected fermentors at startup. Up to 6 fermentors, 12 integrators and 6 pumps can be connected to one PC.

There is no need of programming knowledge.