eppendorf

Support Growth

Fibra-Cel® Disks – A solid support growth material for cell culture


eppendorf
BioFlo® 320

Suspend Your Disbelief

By using Fibra-Cel Disks, you can link the performance of your adherent cell line with the advantages of stirred-tank bioreactors. Fibra-Cel is a solid support growth matrix for mammalian and insect cells, used predominantly for production of secreted products such as recombinant proteins and viruses. When combined with the Eppendorf proprietary packed-bed impeller system, Fibra-Cel Disks enable growth of attachment-dependent cells in stirred-tank bioreactors and eliminate the need for cell filtration to separate cells from the end product.

Performance

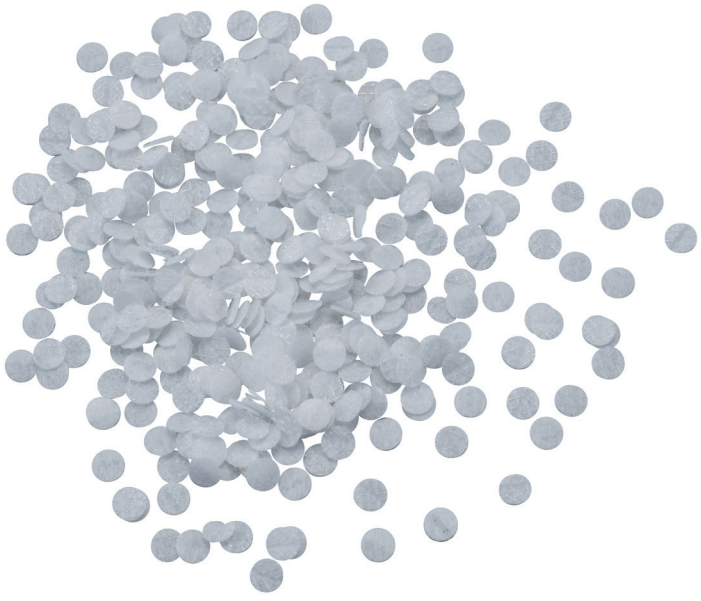
> Proven culture success with a variety of cell lines
> High surface-to-volume ratio supports high cell densities and productivities
> Low shear environment facilitates the cultivation of sensitive cells

Flexibility

> Usable in glass, single-use, and sterilize-in-place bioreactors
> Large working volume range of compatible bioreactors: 1.9 L to 32 L

Ease of Use

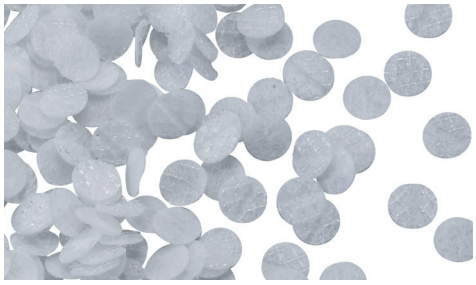
> Single-step inoculation
> Easy product harvest
> Easy setup of perfusion processes



Performance

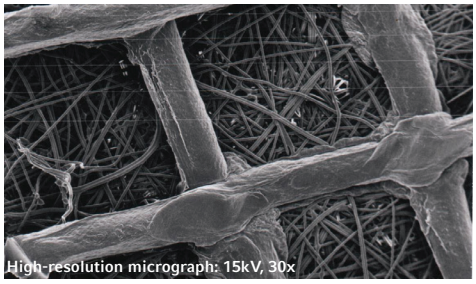
Powerful tools for your success

By providing a growth support, you can make the cultivation of anchorage-dependent cells in stirred-tank bioreactors a reality. Fibra-Cel Disks consist of a three-dimensional mesh to which cells attach, which protects them from damaging shear forces, and which simplifies the harvest of secreted products. Like this, Fibra-Cel Disks can help you in establishing highly efficient cell culture bioprocesses; in terms of cell and product yield as well as workload.



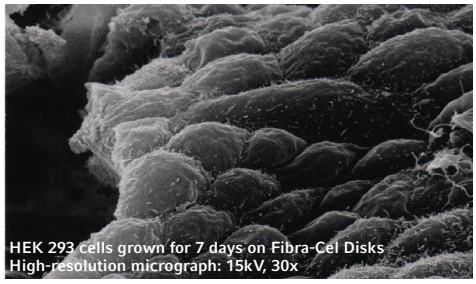
Made to be populated

> Attachment matrix with a diameter of 6 mm
> Electrostatically pretreated to support cell adhesion



Micro-structured

> Made of a polyester/polypropylene mesh
> High surface-to-volume ratio



Growth-supporting

> Provide a low-shear environment, as the cells become embedded in the three-dimensional fiber system

Application examples*

A selection of cell types successfully grown on Fibra-Cel Disks

> Vero (1, 2, 11,13)
> Adherent HEK 293 (3, 4, 5, 6)
> BHK (11)
> CHO (7)
> Mesenchymal stem cells (8)
> Hybridoma (9)
> Insect cells (12)

Typical products and applications

> Recombinant protein expression (4, 5, 6, 7, 9,12)
> rVSV production (1)
> Lentiviral vector production (3)
> Rabies virus production (10, 11)
> Stem cell expansion (8)

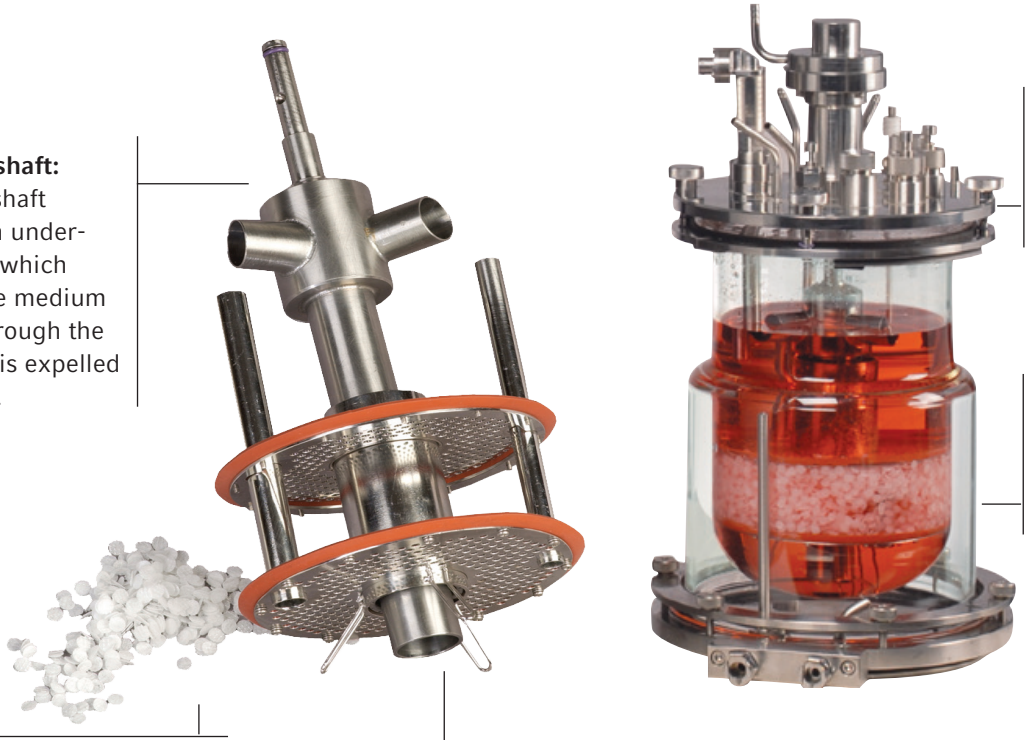
*Please find the reference list on the last page of this brochure. The examples and references are non-comprehensive.

Performance

Powerful tools for your success

By combining Fibra-Cel Disks with the Eppendorf proprietary packed-bed impeller system, you create a three-dimensional matrix. A low pressure drop across the bed minimizes variability and maintains viability of cells over the entire bed. The packed-bed technology convinces with a high and uniform mass transfer of nutrients and oxygen.

The packed-bed impeller is build into the bioreactor to form a packed-bed bioreactor:
The packed-bed impeller forms a compartment inside the bioreactor, in which the Fibra-Cel Disks and the cells attached to them are entrapped.



Impeller shaft:
Rotating shaft creates an under-pressure, which causes the medium to flow through the shaft and is expelled at the top.

Bioreactor headplate:
Can be equipped with sensors and tubes for liquid addition and withdrawal

Packed-bed:
Culture medium and secreted products can pass freely in and out the bed

Fibra-Cel Disks:
Growth matrix filled into the packed-bed impeller

Gassing:
Aeration of the medium takes place inside the impeller tube, providing a bubble-free aeration in and around the packed-bed, which is advantagous for the cultivation of shear sensitive cells.

Flexibility

Use the bioreactor size and material of your needs

You can use Fibra-Cel Disks in combination with glass, single-use, and sterilize-in-place bioreactors of different sizes; dependent on your needs. With Eppendorf packed-bed bioreactors you can realize a growth area of up to 1.4 x 10^6 cm^2, which offers you an enormous potential for process scale-up.

Glass vessels

The Eppendorf glass vessels equipped with packed-bed impeller offer you great flexibility in working volumes; from a bed volume of 0.5 L to 5 L, corresponding to a growth surface of 6 x 10^4 cm^2 to 6 x 10^5 cm^2.

BioBLU® 5p Single-Use Bioreactor

The BioBLU 5p Single-Use Bioreactor combines the advantages of single-use vessels with the performance of packed-bed technology. The BioBLU 5p is preloaded with Fibra-Cel Disks - ready to use, saving you time on setup and cleaning.
The BioBLU 5p Single-Use Bioreactor has a bed volume of 1.5 L, corresponding to a growth surface of 1.8 x 10^5 cm^2.

Sterilize-in-place bioreactors

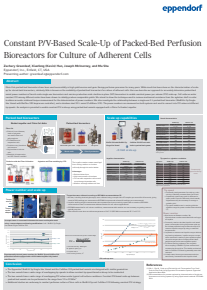
For higher capacity, a sterilize-in-place vessel equipped with a packed-bed impeller is available. The bed volume of is 12.0 L, corresponding to a surface area of 1.4 x 10^6 cm^2.

Overview of available vessel sizes

Working volume	Bed volume	Vessel type	Fibra-Cel Disks per vessel[1]	Total disk surface area	Roller bottle equivalent[2]
1.9 L	0.5 L	Glass	50 g	6.0 x 10^4 cm^2	71
3.8 L	1.5 L	Glass and single-use	150 g	1.8 x 10^5 cm^2	212
5.6 L	2.5 L	Glass	250 g	3.0 x 10^5 cm^2	353
10.5 L	5.0 L	Glass	500 g	6.0 x 10^5 cm^2	706
32.0 L	12.0 L	Stainless steel	1,200 g	1.4 x 10^6 cm^2	1,694

[1] On average, 10 g Fibra-Cel Disks are used per 100 mL bed volume

[2] The roller bottle equivalent is based on an average surface area of 850 cm^2 per bottle


eppendorf
Constant P/V-Based Scale-Up of Packed-Bed Perfusion Bioreactors for Culture of Adherent Cells

Bioprocess scale-up in packed-bed bioreactors

Download this poster to discover, how to determine packed-bed vessel power numbers of bench-scale single-use bioreactors and production-scale sterilize-in-place (SIP) bioreactors to enable constant power per volume (P/V) scale-up.

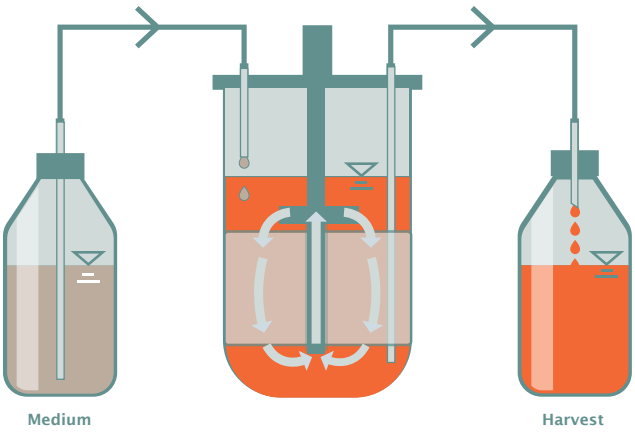
www.eppendorf.group/poster-fibra-cel

Ease of Use

Simple procedures from incolulation to harvest

When you inoculate your bioreactor, the cells become entrapped within the Fibra-Cel Disk bed, where they remain throughout the process. Fibra-Cel Disks enable sustained long-term periods of high-density growth in perfusion, without danger of clogging. They also simplify downstream processing, as they save you the need for subsequent cell filtration to separate cells from the end product.

Efficient cell attachment
Cells usually attach efficiently to the Fibra-Cel Disks, which allows you inoculation in a straightforward manner.
> Cell attachment takes usually only up to one hour
> Cell attachchment is efficient, because cells become imbedded in the fiber system and cannot fall off
> No need for perodically stopping stirring to allow time for cells to become attached



Easy product harvest
As the cells adhere to the Fibra-Cel Disks, they remain in the packed-bed throughout the bioprocess. Therefore you can easily harvest medium and secreted products, without the need for cell separation.

Easy setup of perfusion processes
The packed-bed technology allows you to easily setup a perfusion processes. Fresh medium can be added to the bioreactor through a headplate port. Used medium can be removed from the bioreactor while the cells remain in the packed-bed. This makes filtration unneccessary and therefore avoids the danger of filter clogging.

Vero cell culture in perfusion

Watch our webinar to discover, how a Vero cell perfusion process was set up using a packed-bed bioreactor and how it facilitated achieving high cell densities.

www.eppendorf.group/webinar-fibra-cel

Ordering Information

Ordering information

Description	Order no.
Fibra-Cel® Disks, 50 g	M1292-9984
Fibra-Cel® Disks, 150 g	M1292-9992
Fibra-Cel® Disks, 250 g	M1292-9988
Fibra-Cel® Disks, 1 kg	M1292-9974

Ordering information

Description	Order no.
BioBLU® 5p Single-Use Bioreactor, cell culture, microsparger, packed-bed impeller, optical pH, sterile, 1 piece	M1363-0119
BioBLU® 5p Single-Use Bioreactor, cell culture, macrosparger, packed-bed impeller, optical pH, sterile, 1 piece	M1363-0133

For more information please visit www.eppendorf.com/Fibra-Cel and www.eppendorf.com/BioBLUc

Literature

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