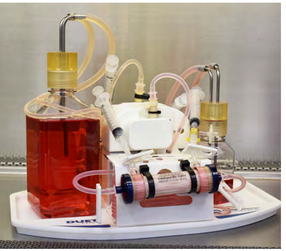
Products

Pumps
Cartridges
Accessories
CDM-HD

PUMPS

The FiberCell Systems Duet (Cat # P3202) pump provides flexible flow rate support for one or two hollow fiber bioreactor cartridges with independent medium reservoirs. It utilizes a unique positive pressure displacement pumping mechanism to provide high flow rates without friction on the pump tubing. It occupies 1/2 shelf, 1/3 height in a standard CO_2 incubator and comes with a thin cord to fit through the incubator door. Full two year limited warranty.



FiberCell Systems Duet Specifications

DIMENSIONS: 9.5"X16.5"X8" (W x L x H)

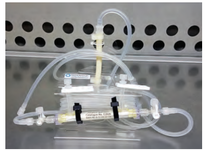
WEIGHT: 4.3 kg

VOLTAGE: 100, 120, 200 (50 or 60 hz)

FLOW RATE: 1-160 mL/minute, continuously variable.

CARTRIDGES

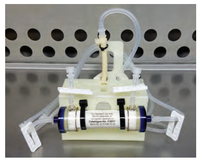
SMALL CARTRIDGES



Cat # C2025 - 0.1 µm pore size for the highest exchange rates but without protein retention. 80 cm^2 outer surface area. PVDF fiber allow for the attachment of matrix proteins, cytokines and antibodies. Ideal fiber for endothelial cell culture under sheer.

Cat # C2025D - 20 kD MWCO polysulfone fiber with 450 cm^2 of surface area. Only one wrap of oxygenation tubing to reduce system dead volume.

MEDIUM CARTRIDGES



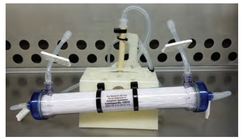
Cat # C2008 - Low MWCO (5 kD @ 50%) hydrophilic polysulfone fiber for recombinant proteins between 25 kD and 100 kD. Appropriate for adherent and suspension cell lines including CHO, HeLa and 293. Can support up to 10^9 cells and produce 100 µg/mL/day or more of recombinant protein in 20 mL ECS.

Cat # C2011 - High MWCO (20 kD @ 50%) hydrophilic polysulfone fiber for monoclonal antibodies and larger recombinant proteins (100 kD or larger). Can support up to 10^9 cells and produce 1-5 mg of a recombinant protein every day or 5-100 mg of a monoclonal antibody every other day. This is the cartridge of choice for PK/PD studies.

Cat # C5011 - The C5011 is the same cartridge as the C2011 but with twice the oxygenation capacity. It is specifically designed for hybridoma scale-up with 2X greater productivity and twice the antibody concentration of the C2011.

Cat # C8008 - Low MWCO (5kD at 50%) cellulosic fiber for PK/PD studies. Cellulosic fiber will have resistance to many solvents and low non-specific binding for certain compounds.

LARGE CARTRIDGES



Cat # C2003 - Low MWCO (5 kD @ 50%) hydrophilic polysulfone fiber for recombinant proteins between 25 kD – 100 kD. 1.2 m^2 of surface area will support up to 5X10^{10} cells and produce 5-20 mg of recombinant protein every day in an ECS volume of 60 mL.

Cat # C2018 - High MWCO (20 kD @ 50%) hydrophilic polysulfone fiber for larger recombinant proteins (100 kD or larger). Can support up to 5X 10^{10} cells and produce 5-20 mg of protein every day in a volume of 60 mL. Appropriate for adherent or suspension cell lines including CHO, HeLa, BHK and 293 cells.

RESERVOIR CAPS

33 mm (Cat # A1005) - Reservoir Cap Assembly fits standard glass bottles. The assembly includes one medical grade polysulfone cap with molded-in silicone plug, two 516 stainless steel delivery tubes one .062" thick white silicone gasket. Withstands repeated autoclaving.

38 mm (Cat # A1006) - Reservoir Cap Assembly fits standard plastic media bottles. The assembly includes one medical grade polysulfone cap with molded-in silicone plug, two 516 stainless steel delivery tubes and one .062" thick white silicone gasket. Withstands repeated autoclaving.

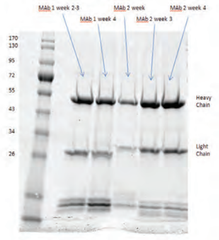
45 mm (Cat # A1008) - Reservoir Cap Assembly fits Gibco® media bottles. The assembly includes a 516 stainless steel cap assembly with two angled tubes, a 45 mm threaded sealing ring and one white silicone gasket to seal the bottle firmly against the cap for leak proof operation.

PK/PD Reservoir Cap (Cat # A1007) The 5 port in vitro toxicology reservoir cap is intended to allow the introduction of drugs and diluent to the central reservoir while maintaining a constant volume.

CDM-HD

CDM-HD (Cat # CDM-1) is designed specifically for the culture of cells at high density and optimized for use in our hollow fiber bioreactor systems.

CDM-HD provides lot-to-lot consistency and is an economical replacement for serum. It is available as a dry powder to make up one liter and is used at a concentration of 10%.



Cartridge/Flowpath Specifications

Catalog No.	Size	Surface Area	Fiber Type	Packing Density	ECS Volume	MWCO 50%	Max. Cell#	Oxygenator
C2025	Small	80 cm^2	PVDF	39%	3.9 mL	0.1 µm	10^8	1.5 m
C2025D	Small	450 cm^2	High flux PS	50%	3.2 mL	20 kD	10^8	.65 m
C2025F	Small	450 cm^2	Low flux PS	50%	3.2 mL	5kD	10^8	.65 m
C7025	Small	80cm^2	hydrophilic PVDF	42%	3.7 mL	.03 µm	10^8	.65 m
C2008	Medium	4000 cm^2	Low flux PS	50%	20 mL	5 kD	10^9	4 m
C2011	Medium	4000 cm^2	High flux PS	50%	20 mL	20 kD	10^9	4 m
C5011	Medium	4000 cm^2	High flux PS	50%	20 mL	20 kD	2 x 10^9	6.1 m
C7011	Medium	880 cm^2	hydrophilic PVDF	50%	24mL	.03 µm	NA	.65 m
C8008	Medium	1600 cm^2	cellulosic	38%	28 mL	5 KD	NA	.65 m
C2003	Large	1.2 m^2	Low flux PS	50%	70 mL	5 kD	5 x 10^{10}	6.1 m
C2018	Large	1.2 m^2	high flux PS	50%	70 mL	20 kD	5 x 10^{10}	6.1 m

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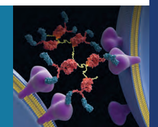


FiberCell Systems
A BETTER WAY TO GROW CELLS

A Better Way to Grow Cells

Up to 100x greater productivity
Most *in vivo*-like conditions
Easy cell culture scale-up

3-D Cell Culture

Monoclonal Antibody Production

Recombinant Protein Production

Exosome Production

Cell Co-Culture

Pk/Pd

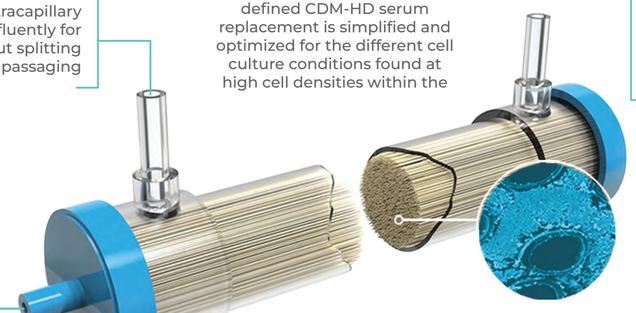
Hollow Fiber Bioreactors: A Better Way to Grow Cells

A closer look at the FiberCell Systems cartridge

Cells seeded in the extracapillary space grow post-confluently for many months without splitting or passaging

FiberCell System's chemically defined CDM-HD serum replacement is simplified and optimized for the different cell culture conditions found at high cell densities within the

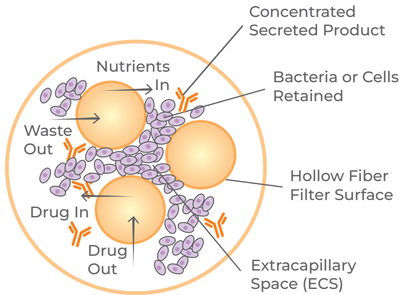
Ideally suited for continuous collection of secreted products at high concentrations



The Duet pump continuously recirculates medium through the hollow fiber bioreactor cartridge (HFBR) to provide nutrient and oxygen while removing waste and CO_2

The closed, bio-safe system is cGMP compliant

The unique cellular microenvironment is generated by the cells themselves and facilitated by the molecular weight cut off of the fibers



APPLICATIONS

3-D Cell Culture
The medium-sized cartridge offers 3,000 cm^2 of surface area, equivalent to 40 T-75 flasks, but can support up to $2x10^9$ cells

Monoclonal Antibody Production
In the HFBR, hybridomas can yield up to 100 mg of antibody every two days, for months of culture

Recombinant Protein Production
Typical protein harvests from FiberCell Systems' cartridges contain 100 µg/mL/day or higher. Daily harvests are 2 mg to 10 mg a day.

Exosome Production
Gram quantities of exosomes can be produced in HFBRs

Cell Co-culture
The PVDF fiber allows various matrix proteins to be bound to its surface

PK/PD
Mimic human bioavailability of antibiotics

Learn more at **www.fibercellsystems.com**

FiberCell Systems®
A BETTER WAY TO GROW CELLS

Discover what so many researchers and biotech companies already know.

Why Use FiberCell Systems 3-D Hollow Fiber Bioreactors?

- Mimics the mammalian circulatory system for *in vivo*-like cell culture conditions
- Eliminates splitting and passaging of cells allowing for months of continuous culture and production
- *in vivo*-like cell densities permit cells to generate their own microenvironment
- Constant levels of nutrients, gas, pH and waste metabolites resembles natural homeostatic control
- Concentration of secreted product 10-100 X higher than standard 2-D culture
- Reduced harvest volumes of 10-60 mL
- Replaces 10's to 100's of flasks, roller bottles or cell stacks
- Closed system for enhanced biosafety
- Fits easily in a standard CO_2 incubator
- Proprietary wavy high-gross-filtration-rate fibers for improved viability and uniform conditions
- Chemically defined CDM-HD is optimized for the unique high cell density of hollow fiber bioreactors

2-D Versus 3-D Cell Culture

3-D hollow fiber changes the way you culture and grow cells, providing you with the simplest and cleanest cell harvest process as compared to traditional 2-D cell culture methods such as T flasks and roller bottles. It is the most *in vivo*-like way of culturing cells, and clearly a better way to grow cells.

Better Productivity
- Cell-to-cell interactions have time to develop
- Supports continuous production for many months or longer
- Requires only 15 minutes a day per cartridge, less labor required
- Mimics the mammalian circulatory systems for *in vivo*-like culture conditions
- Eliminates splitting and passaging of cells

More Cost-Saving
- Replace 100% of flasks
- Higher cell density and cell numbers per cartridge
- Easy cell culture scale-up either with longer culture times or larger cartridges=no need for more flasks and more of everything
- Chemically defined CDM-HD is optimized for the unique high cell density environment of hollow fiber bioreactors

Ease of Use
- CDM-HD optimized=no need for serum media
- Fits easily up to 4 bioreactors in a standard CO_2 incubator
- Reduced harvest volumes of 10-60 mL
- Replaces 10's to 100's of flasks, roller bottles or cell stacks
- Closed systems for enhanced biosafety

Improved Quality of Cultured Cells & Products
- Cell micro environment not determined by culture medium, but cells can generate their own supportive micro-environment
- *in vivo*-like morphology and proliferation, polarity can be preserved
- Better access to nutrients and gas exchange
- 10 to 100x more concentrated than 2-D cell culture
- Constant levels of nutrients, gas, pH and waste metabolites resembles natural homeostatic control
- Concentration of secreted product 10-100 X higher than standard 2-D culture
- Proprietary wavy high-gross-filtration-rate fibers for improved viability and uniform conditions

FiberCell Systems is personally committed to providing the optimum collaborative sales and technical support experience. We have been the pre-eminent supplier of laboratory-scale hollow fiber bioreactors for over 20 years. We have no shareholders or investors to please. Our number one job is to maximize end user satisfaction and scientific success. We look forward to working with you.