



ERTELAL SOP

THE FIRST NAME IN LIQUID FILTRATION

MicroCap Pro™ Depth Filter Capsules

Uniquely Flexible to Meet Your Processing Needs



MicroCap™
Pro Single-Use Capsules

ErtelAlsop: MicroCap Pro™ Single-Use Microfiltration System

MicroCap Pro Single-Use Filtration System for Production-Scale Processing

Our Disposable MicroCap Capsules, on a Larger Scale

MicroCap Pro is our innovative disposable microfiltration technology, specifically designed for production-scale microfiltration in the biopharma and pharmaceutical industries. MicroCap Pro is a versatile solution for:

- Pilot-scale processing
- Production-scale processing
- Converting to a single-use system

Our MicroMedia™ is at the heart of the MicroCap single-use system.

Available in a variety of grades, MicroMedia contains Celpure®, High Purity Diatomaceous Earth, High Purity Cellulose, or MicroClear™, with several immobilized activated carbon options.

Apart from the convenience of single-use capsule modules and media, our carefully designed disposable materials make MicroCap Pro:

- Cost-effective
- Efficient
- Safe

► Typical Applications:

- Pre-membrane phases
- Post-fermentation phases
- Harvest separation
- Clarification
- Mammalian cell cultures
- Cell lysates
- Vaccines
- Blood plasma proteins and serum
- Media
- Virus removal

Scalable, Versatile, and Simple

The MicroCap Pro system provides a complete portfolio for easy scalability and a seamless transition from a lab-scale environment to production-scale. Like the smaller version of the MicroCap product line, the entire filter media suite is a single-use entity, designed for convenience and safe, easy sterilization. Our MicroCap Pro capsules can also be used in other company chassis, making MicroCap Pro one of the most versatile and industry-friendly microfiltration systems around.

MicroCap™
Pro Single-Use Capsules





Discover the Convenience of Single Use

Depth filter media in single-use MicroCap format is a versatile substitute for reusable systems because they are more convenient, efficient, and highly sanitary.

The entire MicroCap suite is single-use, eliminating the need for cleaning and re-validation after each campaign.

- Benefit from an easier validation process by using MicroCap capsules
- All MicroCap single-use capsules are complete with certifications and full validation guides

Without the use of caustic chemicals in equipment cleaning and the hassle of constant validation, our single-use filtration systems are both a cost-effective and environmentally responsible choice.

► Reduce Exposure

Put Safety First with Single-Use

- Without the extensive cleaning requirements, single-use systems reduce exposure to open containers, so that employees can avoid contact with chemicals and biohazards.
- The MicroCap Pro chassis is designed for both pre- and post-use sterilization.

Features & Benefits of The MicroCap™ Pro System

| Features | Benefits |
|--|--|
| Completely disposable capsules | <ul style="list-style-type: none"> • Simplifies pre- and post-filtration sterilization protocols • Safer than reusable systems • One-time validation saves time and cost |
| Uses premier MicroMedia: XL Series with Celpure® diatomite or MicroClear with activated carbon | <ul style="list-style-type: none"> • Consistent and repeatable results • Maximize throughput • Lot-to-lot consistency • Low extractables • Optimize downstream membrane protection • Minimize risk |
| Scalability and flexibility | <ul style="list-style-type: none"> • Fits processing needs as they grow or change • Large batch capabilities • Intuitive process with our ready-to-use platform |
| Ergonomic design | <ul style="list-style-type: none"> • Easy to set up and use • Faster changeouts |
| Universal capsules | <ul style="list-style-type: none"> • Available in 3 sizes • Retrofit most other company chassis |

Anatomy of MicroCap Pro™

Chassis:

- Designed for mobility
- Uses minimal floor space
- Ergonomic design facilitates easy handling, installation, and disassembly
- 316L polished Stainless Steel
- Validation support package
- Locking casters

Capsule:

- Fits seamlessly with ErtelAlsop chassis as well as other single-use chassis
- High solids capacity
- Polypropylene internal media support structure
- Platinum cured silicone or Viton® seals
- Certificate of Compliance for each capsule
- Validation support documents
- Glass-filled polypropylene body and manifold assemblies

Media:

- High purity Celpure® diatomite
- Immobilized activated carbon
- Increased throughput
- Nominal retention ratings: from 0.25 – 15.0 microns
- Samples are available for testing and validation



► Versatile Simplicity

Our priority is optimizing your functionality. A highlight of the ErtelAlsop MicroCap Pro system is that capsules can fit in most existing chassis. Product testing is available either at your facility, through our network of distributors, or at our in-house laboratory.

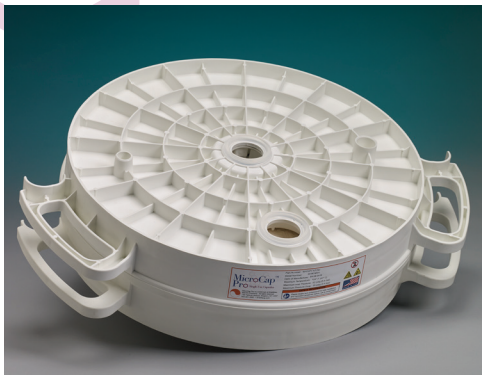


Microfiltration System for Production-Scale Processing

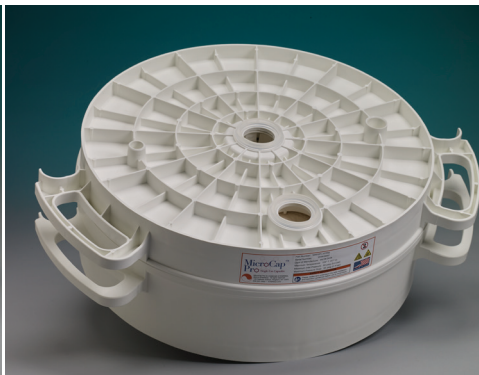
| Filter Area | | |
|----------------------|--------------------------------|--------------------------------|
| MicroCap Pro Capsule | Single Layer (m ²) | Double Layer (m ²) |
| MCP3 | 0.66 | 0.66 |
| MCP5 | 1.09 | 1.09 |
| MCP7 | 1.53 | 1.53 |



Manifold (part # MFLDT6)



MCP3

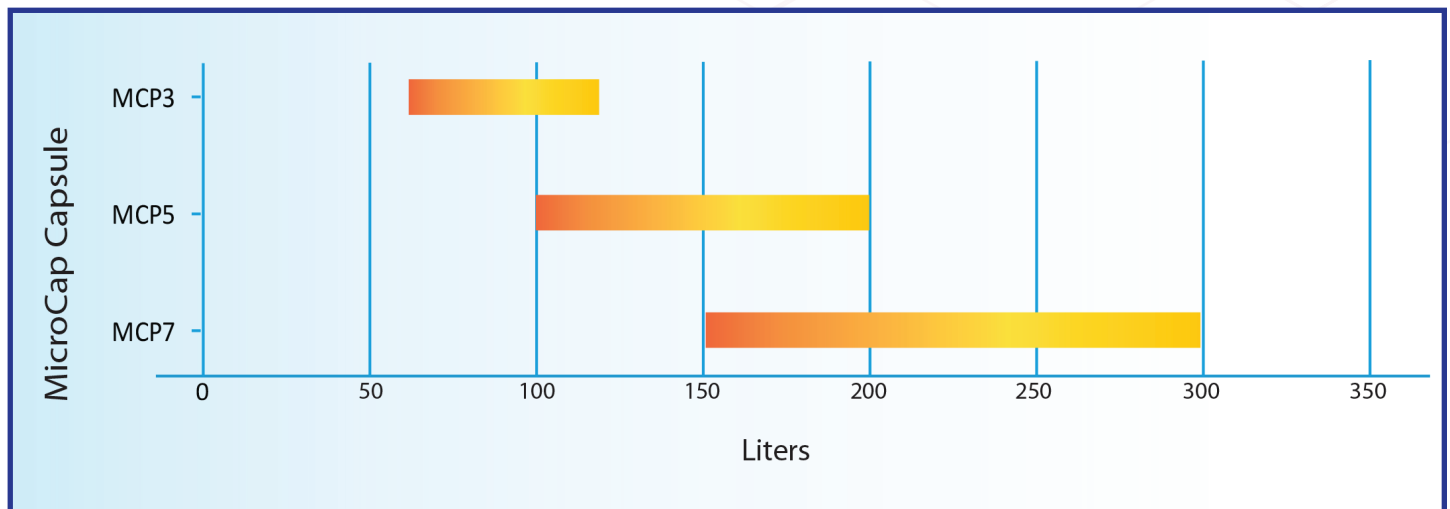


MCP5



MCP7

Approximate Batch Size





Pharmaceutical grade MicroMedia™ Filter Sheets: MicroCap Pro Media

Our Media Has

- A naturally higher void volume, which enhances throughput, making it high-performance
- A uniquely balanced combination of cellulose fibers, Celpure® diatomite (our diatomaceous earth (DE) filter aid), and wet strength resin
- A variety of pharmaceutical grades of MicroMedia™ filter sheets that can all be used in the MicroCap capsules: MicroClear, XL Series, and DXL Series

MicroCap Pro™ Media comes complete with:

- Full certification for pharmaceutical grade media specifying materials composition and other technical details
- Validation guide - Technical Document MCPVG-19 Rev A

MicroCap Pro™ Media Grades

| Media Series | Media Grades | Nominal Rating (µm) | Format | Filter Properties/Material |
|--|--------------|---------------------|--------------|---------------------------------------|
| XL | M953P | 0.25– 1.0 | Single Layer | Cellulose with high purity filter aid |
| | M853P | 0.3 – 1.25 | | |
| | M703P | 0.45 – 1.5 | | |
| | M503TP | 0.8 – 2.75 | | |
| | M503P | 1.0 – 3.0 | | |
| | M453P | 2.5– 6.0 | | |
| | M403P | 5.0 – 12.0 | | |
| | M103P | 10.0 – 17.0 | | |
| | M053P | 15.0 – 20.0 | | |
| DXL* | B9E9 | 0.25 – 1.0 | Double Layer | Cellulose with high purity filter aid |
| | B6E9 | 0.25 – 2.75 | | |
| | B5E8 | 0.3 – 3.0 | | |
| | B4E7 | 0.45 – 6.0 | | |
| | B2E6 | 0.8 – 17.0 | | |
| | B1E5 | 1.0 – 20.0 | | |
| MicroClear | MC55P | Steam Activated | Single Layer | Cellulose with activated carbon |
| | MC55CP | Chemical Activated | | |
| | MC55GP | Steam Activated | | |
| * Other media combinations available upon request | | | | |

ErtelAlsop's MicroMedia™ XL Series Depth Filter Media

- Incorporates a high-performance grade of diatomaceous earth (DE), Celpure® diatomite, for enhanced filter performance.
- Reduced levels of metals and contaminants result in increased permeability and purity compared to conventional DE, contributing to its usability as a filter for products that must meet the highest standards.
- Its high purity, low extractables and rigorous quality control make it the leading product for depth filtration in critical pharmaceutical and biologics applications.

Advantages of XL Series

- High purity (pharmaceutical) media grades
- No crystalline silica
- High void volume
- High throughput capabilities
- Retains consistent flow through media over time
- Variety of media grades and configurations to custom fit your production needs
- Low extractables
- Strong viral removal capabilities

Multiple Layers: MicroCap Pro™ DXL & PXL

DXL

- DXL Series depth filter capsules consists of two distinct layers of XL Series Filter Media. The double-layer configuration maximizes contaminant loading within the body of the filter structure for prolonged filter life.
- DXL Series depth filter capsules efficiently manage process streams containing high solids that are often associated with low viability cell cultures.
- Combining any two layers of ErtelAlsop's XL Series media allows the design of a filter solution to
 - Address the unique characteristics of a process stream
 - Improve process optimization

PXL

- PXL media is a complex of filtration mediums that enable significantly improved throughput and superior contaminant retention in high solids loading processes.
- PXL media is ideal for protecting price and contaminant sensitive process steps further downstream.

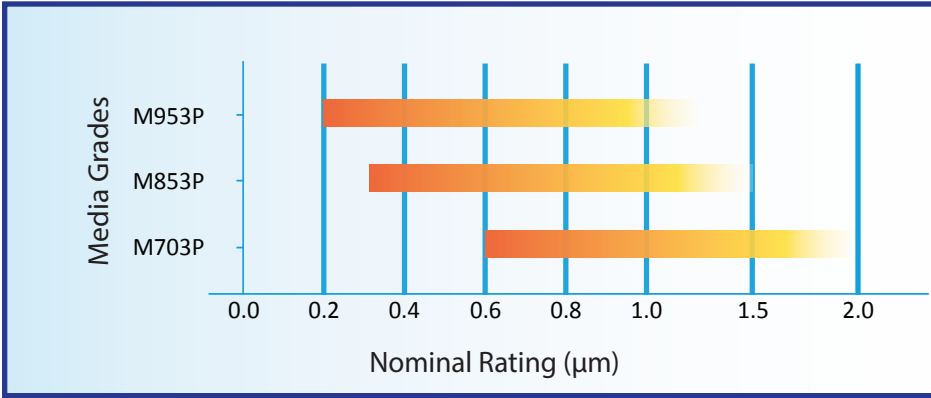
PXL Composition

- Comprised of ErtelAlsop's XL Series depth filter media, PXL media has the filtration benefits and extremely low extractables content that comes from highly purified diatomaceous earth (DE).
- Coupled with our proprietary P200 web complex, the PXL media is unparalleled by other traditional cellulosic based depth filter media in gross contaminant loading capabilities.



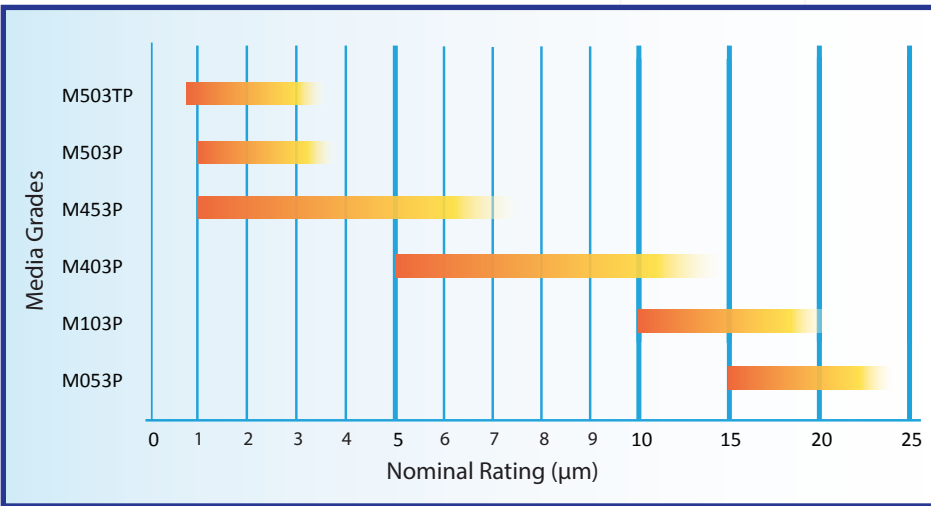


Fine to Medium Filter Media Grade



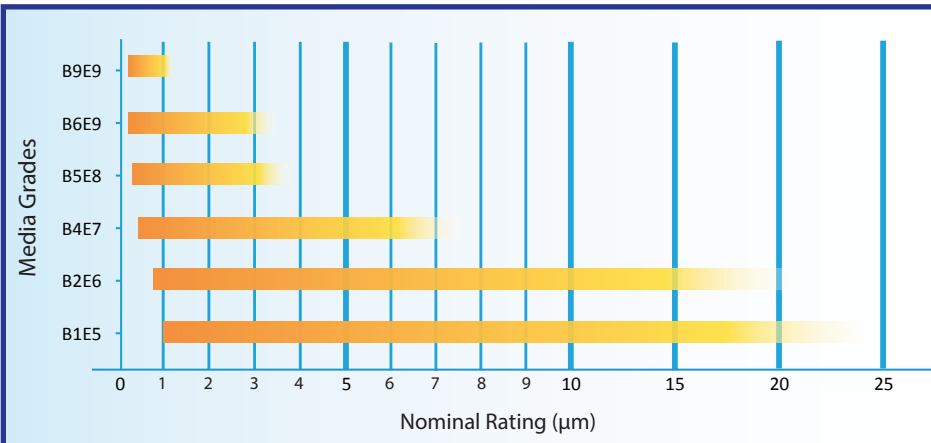
MicroMedia or XL Series filter sheets for the clarification of very fine to medium (0.25 - 2.0 micron) sized contaminant from process streams. Available in all six sizes of MicroCap single-use capsules.

Medium to Coarse Filter Media Grade



Process streams containing medium to coarse (1.0 - 25 micron) sized contaminant, XL Series depth filter media grades provide enhanced throughput and lower extratables. Available in all MicroCap single-use capsules.

DXL Series



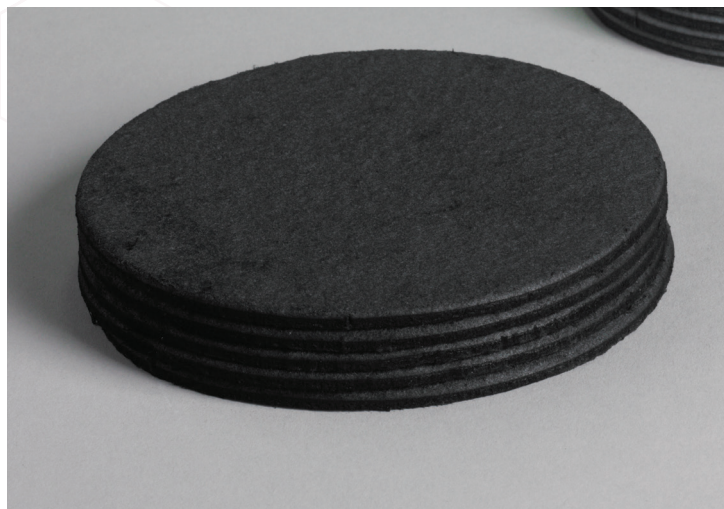
Developed for process streams with high solids removal needs, large particle distributions, or reduction of staged filtration. The DXL grades combine two distinct layers of XL series depth filter media in a single capsule. Scalable results in all six MicroCap single-use capsule sizes.



MicroClear™ Series Depth Filter Media

Unlike other depth filter media designed for mechanical particle removal, MicroClear™ depth filter media:

- Is designed for adsorption of colors, odors or other soluble contaminants
- Consists of immobilized activated carbon and cellulose fibers, providing superior adsorption characteristics over traditional stirred tank or packed bed carbon applications
- Is designed for use in a single-pass process, the large surface area of carbon enables highly efficient color or odor removal in a process stream.



MicroCap Pro™ Carbon Content per Unit Area

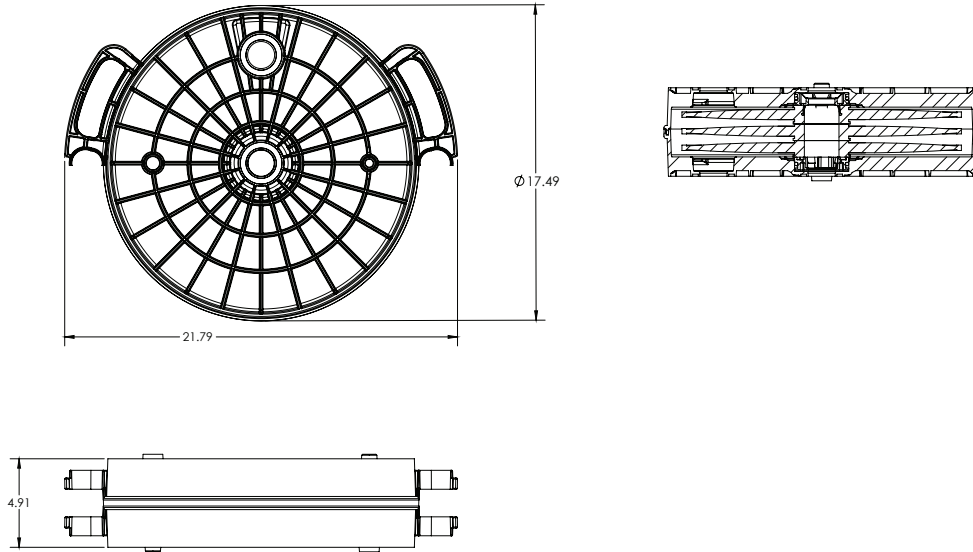
| MicroCap Pro Capsule | Amount of Carbon (kg) | | |
|----------------------|-----------------------|--------|--------|
| | MC55P | MC55CP | MC55GP |
| MCP3 | 9.8 | 8.9 | 7.7 |
| MCP5 | 16.4 | 14.8 | 12.9 |
| MCP7 | 22.9 | 20.6 | 17.9 |

MicroClear™ Activation Methods & Typical Applications

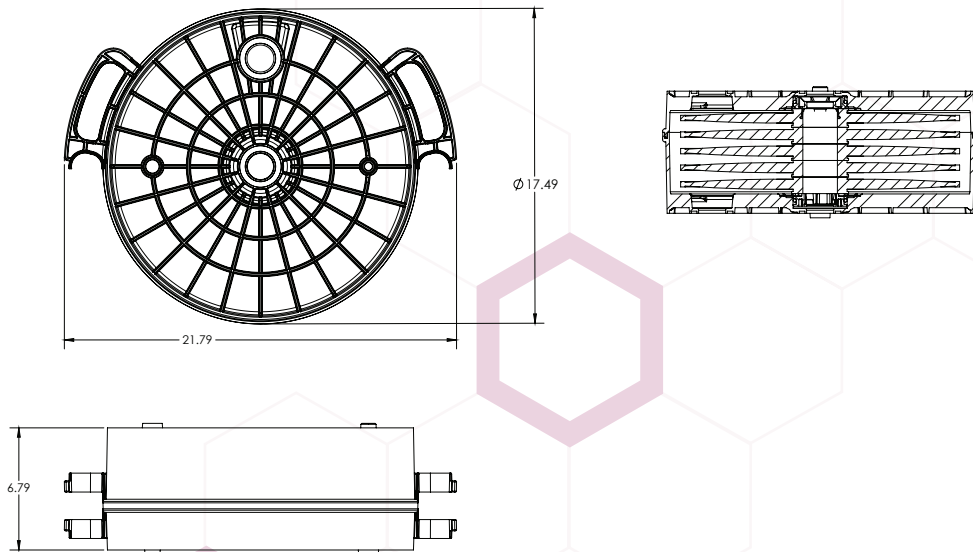
| Media Grade | Activation Method | Typical Application |
|-------------|-------------------|--|
| MC55P | Steam | Decolorization Medium to Dark Compounds |
| MC55CP | Chemical | Decolorization Dark Compounds |
| MC55GP | Steam | Decolorization Light to Medium Compounds |



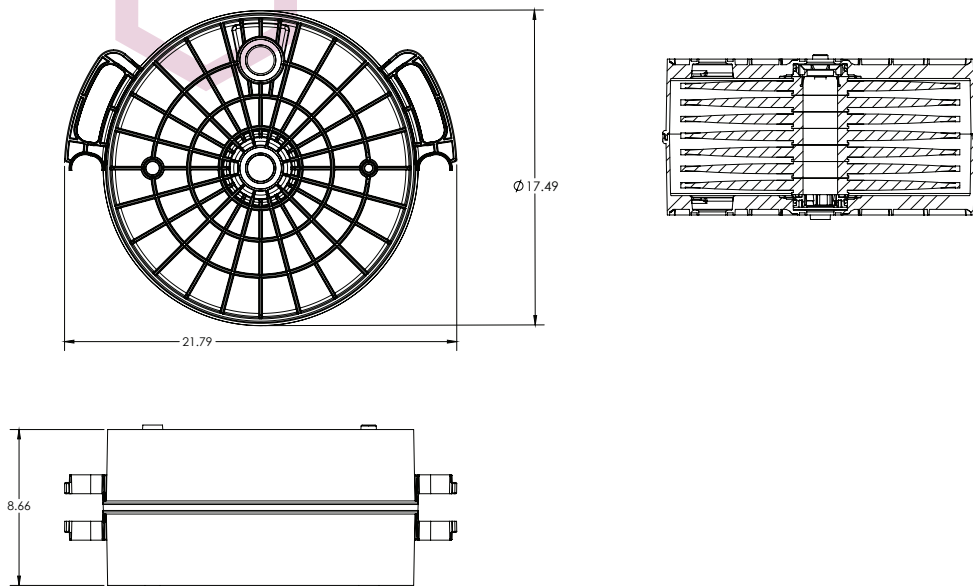
MCP3



MCP5



MCP7





Technical Specifications

| Materials of Construction | |
|--------------------------------------|---|
| Capsule Shell and Internals | Glass-filled polypropylene Platinum-cured silicone |
| Capsule Filter Media | Cellulose fibers Diatomaceous Earth Powdered activated carbon* Resin |
| O-rings | Silicone |
| Maximum Operating Pressure | 3.5 bar (50 psi) at 25°C and 1 bar (14 psi) at 60°C |
| Maximum Differential Pressure | 2.4 bar (35 psi) at 25°C |
| Sterilization - Autoclave | 2 cycles @ 125°C for 60 minutes |

*Carbon with MicroClear Capsules Only

MicroCap Pro™ Ordering Information

Example: M503PCAP3S6 is a MCP3 capsule with M503P media with Silicone Gaskets.

| M503P | CAP | 3S | | 6 | |
|-----------------|------|--------------|---------------------|---------------------------|-------------|
| Media | Type | Capsule Size | Capsule Description | Vent/Drain O-Ring Options | Description |
| See Media Chart | CAP | 3S | 3 Cell SUDS | 6 | Silicone |
| | | 5S | 5 Cell SUDS | | |
| | | 7S | 7 Cell SUDS | | |

MicroCap Pro™ Manifold

| Manifold Part # | Size | Inlet/Outlet Connection | Connection Size |
|-----------------|------------------------|-------------------------|----------------------|
| MFLDT6 | Fits All Capsule Sizes | Sanitary Tri-Clamp | 2 in. Sanitary Clamp |

MicroCap Pro™ Chassis

| Chassis Part # | Small Capsule Capacity | Medium Capsule Capacity | Large Capsule Capacity |
|----------------|------------------------|-------------------------|------------------------|
| MCP-S | 4 | 3 | 2 |
| MCP-L | 12 | 8 | 7 |



Unmatched Customer Service and Support

ErtelAlsop aims to deliver exceptional products based on the direct needs of the customer. We remain available to our customers throughout their use of our products, as well as through trials and scaling activities, to facilitate your operation with efficiency, safety, and consistent production quality as our primary concerns.

ErtelAlsop

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