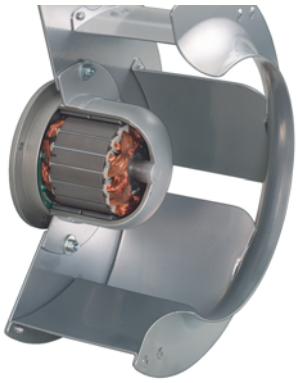
# Pharmaseal® FFU

## Room Side Testable Filter/Fan Ceiling Module

The Pharmaseal FFU is the first product designed and tested to meet the Life Science industry certification factory and field aerosol testing requirements. The ceiling module provides energy efficient powered clean room level air filtration. Its unique room side replaceable filter and aerosol injection system design minimizes downtime and ensures repeatable consistent certification while still utilizing the features and benefits of the Pharmaseal, the industry's leading terminal housing.

- Innovative internal baffles ensure uniform airflow across the filter face and attenuate sound.
- Includes a proprietary aerosol injection and distribution system for uniform dispersion across the entire face of the filter to certify filter installation
- Room side maintenance of all working components
- Total Flexibility: As the needs change in a facility, Pharmaseal Filter Fan Units can be exchanged with lay-in lights or blank panels. For facilities with lower classification, upgrades can be obtained by simply adding additional FFU's. When a computer controlled management system is installed, units or clusters of units can be remote controlled from the building management system.
- FFU control and monitoring to manage lowest energy usage. Includes a standard energy efficient electronically commutated (EC) brushless DC external rotor fan motor for control of individual FFUs or as a group
- Accepts gel or gasket seal filters that are available in efficiencies from ISO 15 E to ISO 65 E in accordance with the new ISO Standard 29463-1

**Incorporating the most advanced fan, motor and control technology into the industry's leading terminal housing.**



The Pharmaseal FFU incorporates electronically commutated (EC) fan technology for greater energy efficiency.

## DETAIL

The Pharmaseal FFU is a fan-powered option of the Pharmaseal filter housing. In addition to the industry leading features of the Pharmaseal, the FFU option has the following features:

**1. Electronic Fan Speed Adjustment**

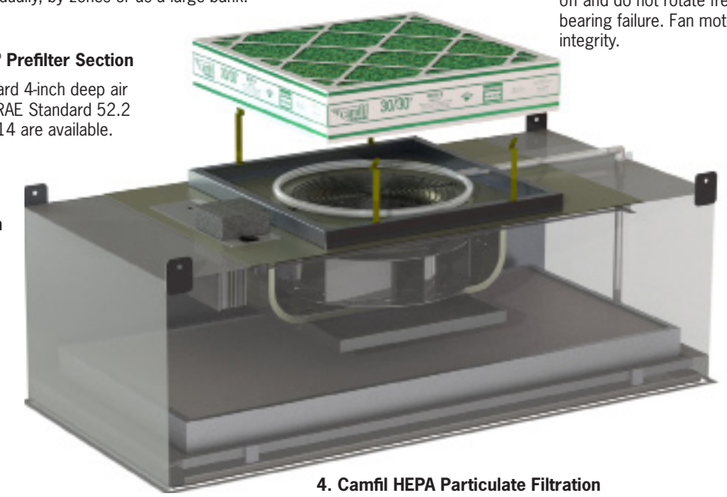
Pharmaseal FFUs can be speed-adjusted individually, by zones or as a large bank.

**2. Integrated 30/30® Prefilter Section**

Accepts industry standard 4-inch deep air filters. MERVs per ASHRAE Standard 52.2 from MERV 8 to MERV 14 are available.

**3. All-Welded Housing Construction**

Pharmaseal housing is guaranteed to be leakfree to 3" w.g.



**4. Camfil HEPA Particulate Filtration**

Camfil prefilters and Megalam HEPA filters ensure optimum performance and the lowest total cost of ownership.

**5. Solid Air/Aerosol Diffuser Plate**

The proprietary air/aerosol diffuser assembly ensures adequate dispersion of filter challenge for filter testing and/or room certification. The challenge is spread evenly across the face of the filter so that filters can be scan tested. It also ensures uniformity of airflow through the filter.

**6. Backward Inclined Fan**

High efficiency, low noise, high air volume delivery fan.

**7. Electronically-Commutated Fan Motor**

Electronically-Commutated (EC) fan motors are highly efficient during operation. EC motors magnetically "lock" when turned off and do not rotate freely which can cause premature bearing failure. Fan motor is intrisically sealed for system integrity.

### Room Side Control at Your Fingertips

The standard power input is 200-277V, single-phase, 50-60 Hz to drive the electronically commutated (EC) brushless DC FFU fan motor. These highly efficient motors allow for remote control of individual FFUs through the entire bank of units. (Note: The optional A/C power unit is controlled locally with a rheostat controller mounted on each FFU).

Each Pharmaseal FFU is assigned a unique electronic identifier. Both controllers (FC-100 and FC-200) communicate with each FFU via an Ethernet connection. The easy-to-learn control hierarchy ensures that your system can be running and tuned-in a very short time.

For sites with a large quantity of FFUs, a computer-driven control solution may be appropriate. An FFU Monitoring and Control System that consists of an FFU control network connected to a computerized FFU Control Center may be recommended. The FFU Control Center allows control of a large quantity of FFUs in a flexible and future-oriented way. For additional information and design assistance, please contact Camfil.

The FC-100 is a hand-held control device capable of controlling up to 100 FFUs.

The FC-200 is a wall-mounted module to control up to 200 FFUs.

Camfil offers two standard controllers as shown above. Both devices offer easy commissioning and operating control by a clear menu structure and a single control element. The FC-200 has additional features like an automatic day/night shift (controlled by external input or by included clock); a 3-level operator rights protocol and non-volatile error storage downloadable to a PC make the FC-200 a smart monitoring and control solution for any size FFU arrays.

PHARMASEAL® FFU

### Testing & Qualification

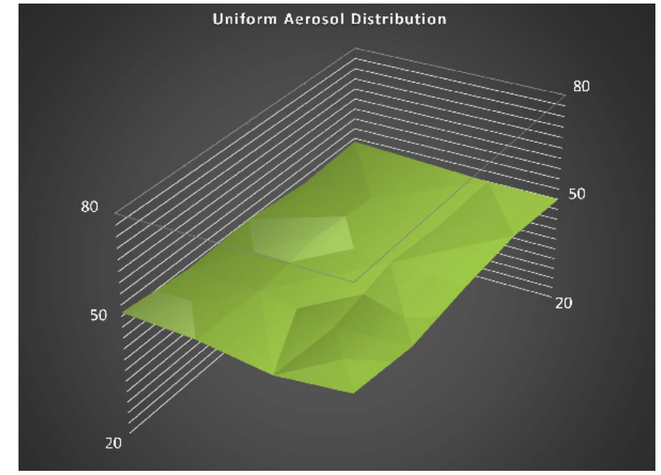
The Camfil Pharmaseal FFU offers our superior aerosol uniformity system. Our FFU offers enhanced air distribution, low noise transmission, and easy cleaning as a standard feature of the Pharmaseal FFU.

Why is this important? Commercial grade FFUs typically distributes inlet air within the plenum space poorly. The Pharmaseal FFU exceeds industry standards for airflow consistency at the grill face. Failure to meet this standard result in certain areas of the filter packs having very high localized flows. Premature filter loading and degradation of the filter's HEPA rating can occur with uneven flow profiles.

As can be seen in the flow profile of the Pharmaseal FFU, our system out-performs the industry standard. A copy of the test report is available.

You can specify the Pharmaseal FFU with the confidence that you will get optimum filter performance and a unit that will comply with current regulatory testing requirements.

Aerosol Distribution Profile Pharmaseal FFU based on 90 fpm flow through a 100mm filter pack.




As can be seen in the aerosol distribution profile of the Pharmaseal FFU, our system deviates less than 7% from the target aerosol concentration of 50 µg/l. The industry standard is 20% relative aerosol deviation with <50% local aerosol deviance. Sample location and test protocol along with results for various FFU configurations are available upon request.

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Technical Report

CFW-ETR-13002

Pharmaseal® FFU Qualification Report

| | |
|---|---|
| Report Conducted by: | |
| Date of Testing: | |
| Report Date: | |

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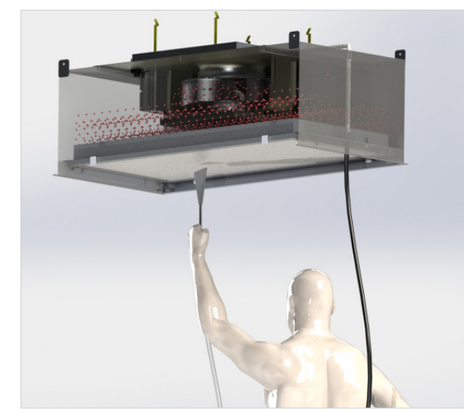
Pharmaseals are tested at 10 critical air-exiting points on the air distribution side of the housing to ensure uni-directional flow to protect critical proccesses.



Testing may be perfomed on site using the standard features of the Camfil Pharmaseal module. Airflow during testing can be controlled from the room side.

# Pharmaseal® FFU

## Room Side Testable Filter/Fan Ceiling Module

## Performance

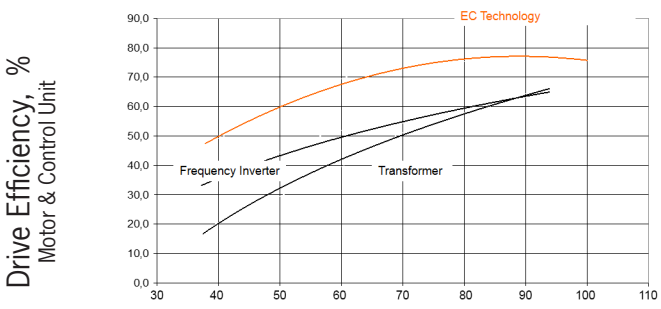
| Pharmaseal FFU with 53MM Megalam Filter Class ISO 45 H (99.995 at MPPS[4]) at 100 fpm | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Size | Airflow (cfm) | Resistance (inches w.g.) [1] | Power (watts) | dBA | Actual Dimensions[2] | | | Weight[3] (lbs) |
| | | | | | Length (inches) | Width (inches) | Height (inches) | |
| 2 x 2 | 217 | 0.54 | 57 | 45 | 22-⅝ | 22-⅝ | 18 | 67 |
| 2 x 4 | 538 | | 78 | 45 | 22-⅝ | 46-⅝ | | 90 |
| 4 x 4 | 1163 | | 139 | 47 | 46-⅝ | 46-⅝ | | 155 |

| Pharmaseal FFU with 100MM Megalam Filter Class ISO 45 H (99.995 at MPPS[4]) at 100 fpm | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Size | Airflow (cfm) | Resistance (inches w.g.)[1] | Power (watts) | dBA | Actual Dimensions[2] | | | Weight[3] (lbs) |
| | | | | | Length (inches) | Width (inches) | Height (inches) | |
| 2 x 2 | 217 | 0.38 | 34 | 43 | 22-⅝ | 22-⅝ | 18 | 70 |
| 2 x 4 | 538 | | 62 | 42 | 22-⅝ | 46-⅝ | | 95 |
| 4 x 4 | 1163 | | 105 | 45 | 46-⅝ | 46-⅝ | | 165 |

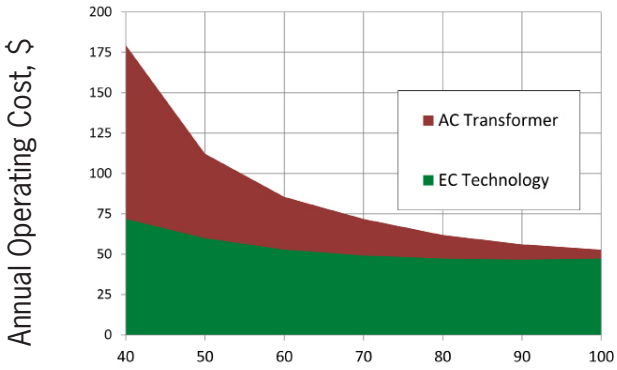
DATA NOTES:
[1] - Without prefilter installed
[2] - Dimensions are FFU hood body only
[3] - Installed weight with applicable filter
[4] - MPPS, Most Penetrating Particle Size

| Hood with 5/8" SPT for T-Bar | Hoods with 1-½" SRT Trim for hard ceiling |
|---|---|
| 2 x 2 (Model 23J23J) – 23-⅝" x 23-⅝" | 2 x 2 (Model 25D25D) – 25-¼" x 25-¼" |
| 2 x 4 (Model 23J47J) – 23-⅝" x 47-⅝" | 2 x 4 (Model 25D49D) – 25-¼" x 49-¼" |
| 4 x 4 (Model 47J47J) – 47-⅝" x 47-⅝" | 4 x 4 (Model 49D49D) – 49-¼" x 49-¼" |

Efficiency Advantage of EC-Technology over AC Technology




Annual Energy Use Comparison




The combination of an EC motor, advanced fan design and Camfil HEPA filter technology provides the most energy efficient performance in a filter fan unit available today. Costs savings utilizing EC controllers over AC can exceed 30% annually.

For additional online information, please go to Life Sciences Filtration.

Certified Quality System

For detailed specifications please consult your local Camfil Distributor or Representative or Pharmaseal FFU.

Camfil has a policy of uninterrupted research, development and product improvement. We reserve the right to change designs and specifications without notice.

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