

Low Profile HEPA/ULPA/PTF E Fan Filter Units

Available options

As the leader in custom engineered Fan Filters Units (FFUs), we are often presented with the challenge of fitting a FFU in a restricted height area. As the semiconductor equipment market continues to pack more equipment in less space, the challenge of getting clean air to the key zones while staying within the space allotted is increasingly challenging

**THE FOLLOWING SLIDES PRESENT
VARIOUS OPTIONS, ALONG WITH THE
PROS AND CONS**

There are two forms of Fan Filter Units (FFUs) than can be used in low profile applications and each has it's place depending on the customers goal for air cleanliness and air uniformity, while fitting in the height available

- 1) STANDARD FFUS (FAN PLENUM ON TOP OF A HEPA/ULPA FILTER)
- 2) SIDE BLOWER/DISTRIBUTION MEMBRANE

Low Profile FFU



**Anodized Aluminum
"EURO" FFU**

In as little as 5" overall height,
plus an additional 3.4"
above the FFU for proper
air entry conditions



Standard 9" overall height Airflotek Euro

In our standard 9" FFU the uniformity of a 2'X4' PTFE version is +4.8%/-4.4% @ 98 FPM. (6 spots measured with a Velgrid and using the Relative Standard Deviation uniformity calculation method) All results stated in the following slides are in relation to these numbers.

Shorten the FFU to 8"

The FPM drops by 3% to 95 FPM while the uniformity is negatively affected only slightly to +4.5%/-6.5%, still within most customer uniformity specifications.

Shorten the FFU to 7”

The FPM drops by 6% to 92 FPM while the uniformity is increasingly negatively affected to +8.1%/-5.9%, still within most customer uniformity specifications.

Shorten the FFU to 6.25", leaving the fan 1/4" from the top of the filter

The FPM drops by 8% to 90 FPM while the uniformity is further negatively affected to +7.0%/-5.2%, still within most customer uniformity specifications.

Additional options for Low Profile FFUs

- 1) The FFU can be constructed so that the main body of the FFU is shorter than the area where the fan wheel is, saving an additional $\frac{3}{4}$ " in the main body. (and so a height of $5\frac{1}{2}$ " overall and $6\frac{1}{4}$ " where the fans are-see next slide)
- 2) Using smaller fans to save an additional $1\frac{1}{4}$ " for a FFU height of 5" across the entire top
- 3) A combination of 1) and 2) allowing a height of 4.4" in the main FFU body and 5" where the fans are located

Mixed height FFU (different heights for the fan section and main body of FFU)



The standard layout for a Fan Filter Unit requires a minimum of 5" of height, plus an additional 2 ¾" above the FFU for air inlet. In some applications it is necessary to make HEPA/ULPA filter air to the side and blow it into a distribution chamber with a CEG membrane across the bottom. In this manner a total height of 2" can be achieved in the area where the filtered air exits. Getting the specified uniformity out of this technique often requires development time, but it can be made to deliver uniformity to meet most applications.

SIDE BLOWER/DISTRIBUTION MEMBRANE

Sample test rig for a Side Blower/distribution membrane application

Test set up for 18" X 63" CEG
"wedge shaped" distribution
plenum

Sloping Plenum (2" to 1")

Test 2'X4'
HEPA FFU
W/external
plenum

