HealthWay Family of Brands - DFS / EEF Description

August 4th, 2020

DFS (Disinfecting Filtration System), also referred to as EEF (Electrically Enhanced Filtration) when used in cleanroom applications:

There are significant advantages of DFS, or electrically enhanced/stimulated air filtration, over conventional filtration. This technology utilizes a proprietary deep pleated 100 percent sealed filter to provide safe electrically enhanced filtration, with an ultra-low pressure drop, high efficiency of particulate removal and dust holding capacity over the life of the filter. This filtration technology can be used in a housing, with or without a blower fan.

How Does DFS Technology Work?

DFS technology, also referred to as Electrically Enhanced Filtration (EEF) uses two mechanisms to maintain the high air cleaning performance in an air purification system:

1. The DFS high energy field creates a self-contained, highly ionized state in the main filter that aggregates or clusters ultrafine particles to make them larger, allowing the main filter to effectively capture ultrafine particles. The high energy field is controlled, and self-contained between the entry ground control grid before the main filter and a rear control grid affixed to the rear of the main filter. All Ions generated by the high energy field are isolated in the main filter between the entry control grid and exhaust control grid on the rear of the filter, not allowing ions to exhaust the DFS system.
2. The controlled, isolated high energy field generated by the DFS continually creates high energy exposure through the pleats and fibers of the main filter creating a microbiostasis ("prevention of organism growth") in the main filter, preventing live organisms from escaping back into the air.

These two mechanisms work together to provide the ultraclean filtration of particles as well as continual prevention of organism growth in the DFS filter.

DFS Air Purification System Stages:

Refer to drawing at bottom of page 3.

1. The high energy field is activated from a high energy power supply to the DFS main filter through the contact located at number 1 on the drawing.
2. The high energy field is contained at proprietary distances between the ground control grid located at number 2 in front of the main filter and the ground control grid located at number 6 on the rear of the main filter. Air enters the main filter through control grid 2 and is energized by the high energy wires located at number 3 on the Detail B drawing cutaway.
3. The high energy field is evenly transferred through the media of the main filter, (reflected as number 5 of the main filter), through the energy transfer grids located at number 4 of detail A drawing. A transfer grid is affixed on the front of each of the 8 filter panels making up one main filter.
4. The rear ground control grid located at number 6 of the drawing isolates the high energy field in the main filter media between the high energy transfer grid and this ground control grid. The filter media fibers are continually being exposed to the high energy field creating microbiostatis effect in the media.

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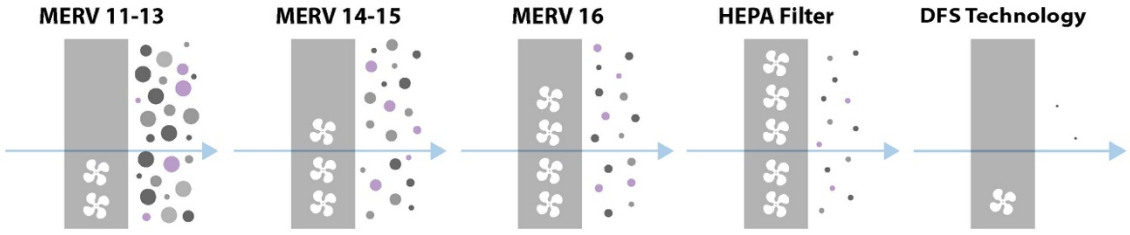
Filtration Efficiency / Particle Size



	MERV 11-13	MERV 14-15	MERV 16	HEPA Filter	DFS Technology
Efficiency	20-50%	50-85%	95%	99.97-99.99%	99.99%
Particle Size	0.3-1.0 microns	0.3-1.0 microns	0.3-1.0 microns	0.3 microns	0.007 microns
Air Pressure Requirement					
Captures	Lead Dust Vehicle Emissions	Lead Dust Vehicle Emissions Smoke Exhalation Droplets	Lead Dust Vehicle Emissions Smoke Exhalation Droplets	Lead Dust Vehicle Emissions Smoke Exhalation Droplets Bacteria Viruses	Lead Dust Vehicle Emissions Smoke Exhalation Droplets Bacteria Viruses **Ultrafine Particles**

Conclusion

The end result, depending on the efficiency of the traditional media used, is as follows: much higher particulate efficiency than traditional media filters and with fan powered machines, a 99.99% at 0.007 micron filtration efficiency, with a greater gram holding weight capacity, resulting in greater lifetime performance and less maintenance and energy cost. The technology has been proven to enable a penetration reduction of 2-3 orders of magnitude (cf. Jaisinghani, “Control and Monitoring of Bioburden in Biotech/Pharmaceutical Cleanrooms”, 2000). All units are also tested to far exceed safety guidelines.

DFS Advantages over synthetic media- Filtration efficiency of synthetic media filters can deteriorate in as little as 2 weeks and by as much as 40-50%. With DFS, the total filtration system is constantly charged ensuring the highest efficiency for the entire lifetime of the filter with ultra-low pressure drop.

ASHRAE guidelines have recommended installing the highest achievable MERV rated filter to best address the likelihood of airborne transmission of virus. DFS technology achieves greater than MERV 16 efficiency with the pressure drop of a MERV 8 and can be installed without a major capital expenditure. It also has a substantially longer and higher performance life cycle.

A number of factors influence the cost associated with using a filter unit. A filter needs to be designed and installed properly so that it will achieve its filtration performance requirements satisfactorily while keeping costs incurred to a minimum. DFS or EEF technology designed with the SUPER V bank filter maximizes the space available for filtration in order to remove the largest amounts of undesirable contaminants, while not allowing them to pass through the filter or multiply once inside the filter. This keeps the operating pressure differential at rated air flow as low as possible to achieve a long service, performance and service life.

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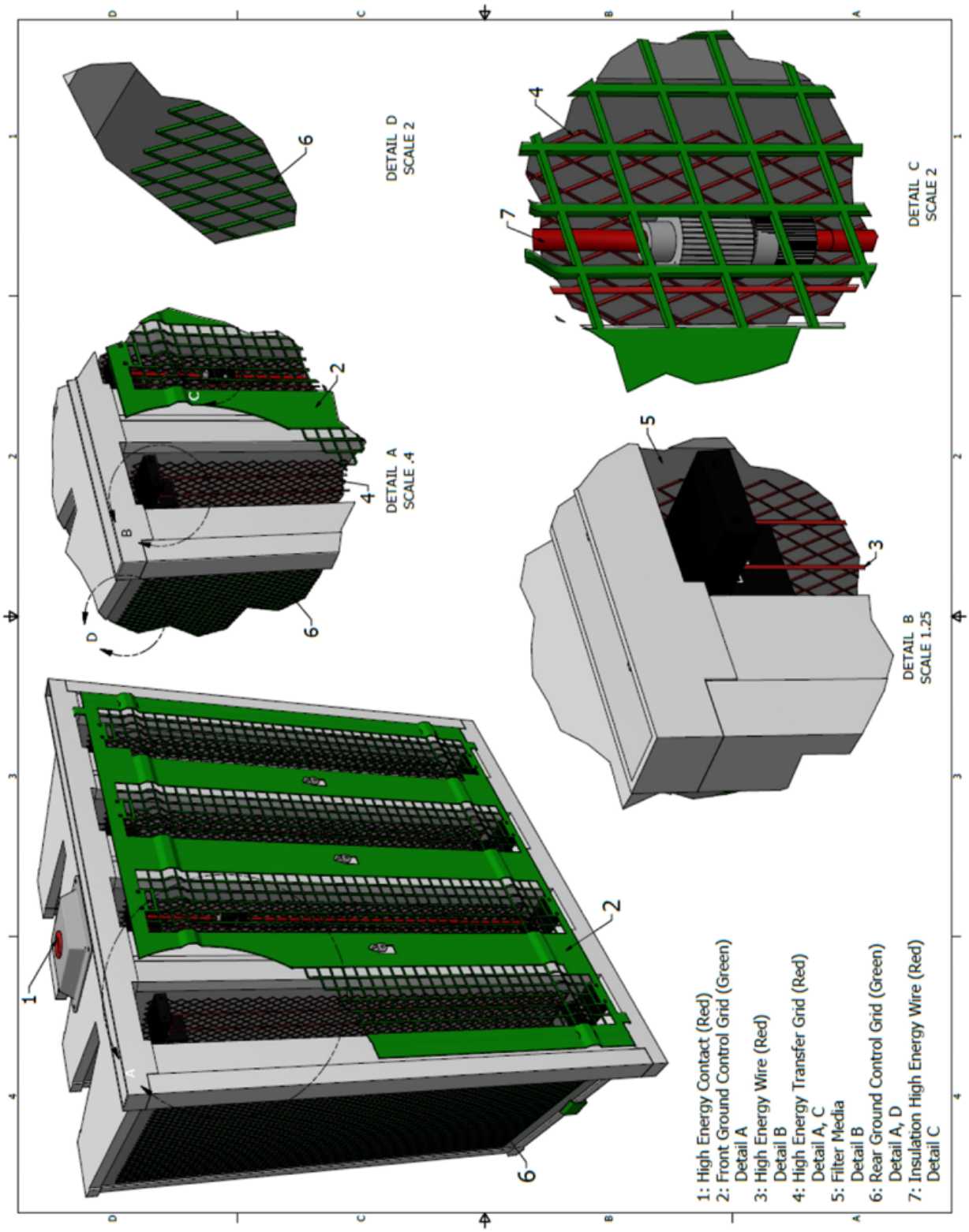

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