

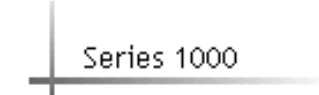
# EEF

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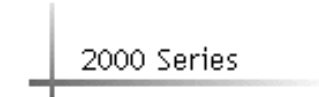

Up



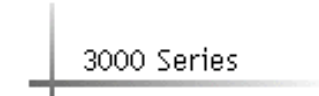
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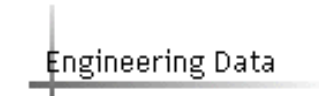
Series 1000



2000 Series



3000 Series



Engineering Data

## EEF Technology

Technovation's Patented\*  
Electrically enhanced Filter (EEF)

- 1997 R&D 100 Award Winner
- 1996 Micro Product All Star
- 1995 NASA Technology 2000 SBIR Award Winner

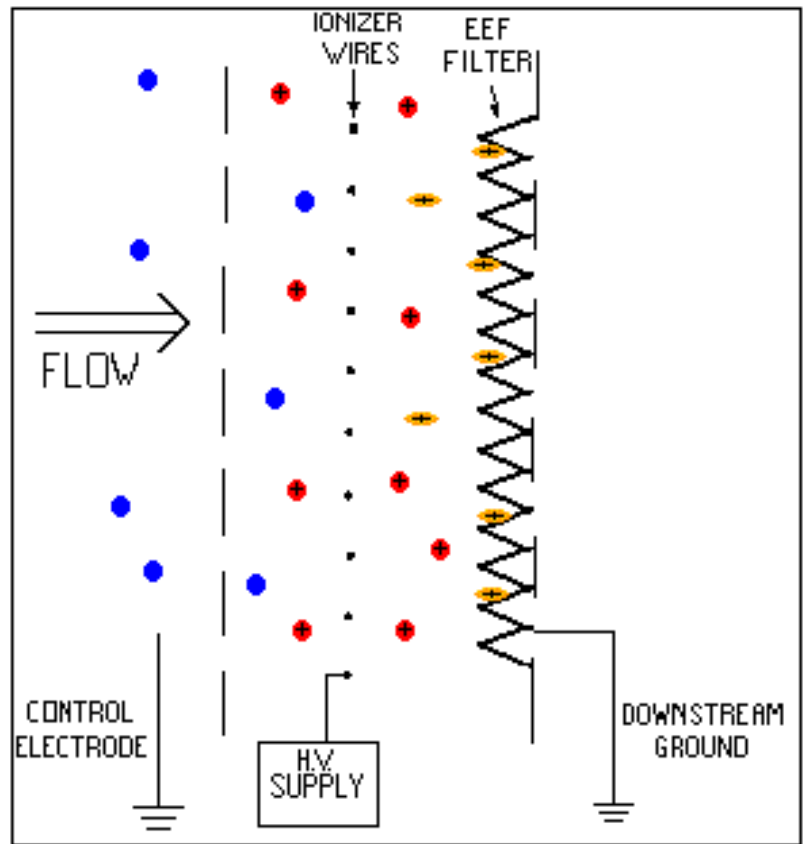
[Engineering/Application Data.](#)

### *EEF: How It Works*

- Flow enters the first high intensity ionizing field.
- Particles and bacteria are charged due to ion flux in this ionizing field- [some of the bacteria are killed here.](#)
- The charged particles and bacteria are efficiently filtered due to dielectrophoretic and electrophoretic forces and other

conventional filtration mechanisms –up to 1000 times lower penetration than conventional filters with the same pressure drop and flow rate.

- Bacteria caught on the filter are continuously subjected to ionizing radiation and thus killed.
- The EEF technology is extremely effective due to the use of two ionizing fields.
- *Safety features:* high voltage is not applied directly to the filter –control electrode prevents arcing towards the filter.



## Main Advantages

### **Biocidal Effects**

Conventional filters can often become a breeding ground for bacteria. Bacteria can grow through the filters and shed in the cleanroom. Biocides on filters are only effective as long as the filters are clean. The BIO PLUS® filter system, however, continuously kills the bacteria caught on the filters by means of ion bombardment, as demonstrated by the tests summarized in Table I.

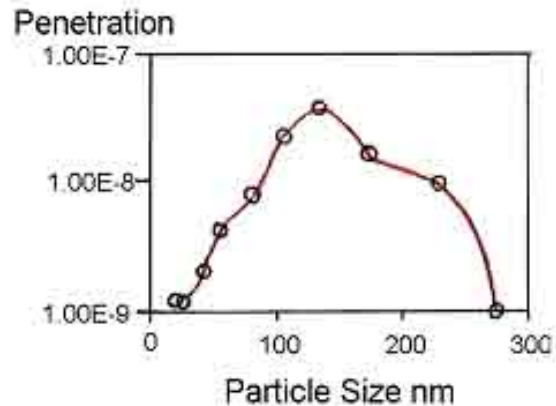
**Table I:** Antimicrobial (*Staphylococcus epidermidis*) tests using **BIO PLUS®** and conventional filters.

- A high concentration of *S. epidermidis* was first sprayed on to the filters as an aerosol.
- After four hours of air flow, the bacteria was extracted from the filters using sterile phosphate buffered saline.
- The extract was diluted at various concentrations and growth media plates were inoculated with it.
- After 24 hours of incubation the colonies formed were counted and the concentration on the filter media was calculated

Filter Description	# of colonies/ sq. inch
BIO PLUS® filter	Typically 0
Conventional filter	$10^5 - 10^6$

### Filtration Enhancement

A low restriction filter's performance is increased by using ionizing electrical fields, resulting in bactericidal effects, low restriction, and reduced filter penetration – by 2- 3 orders of magnitude! The result is high performance with low noise. The lower pressure drop of EEF HEPA enables use with a terminal HEPA in series resulting in 99.999999% filtration efficiency.



\*Patented, April 1995, US Patent 5,403,383

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