

MERV 13 Equivalent Filter Using MERV 8 + GPS' Technology

LEED projects require the use of MERV 13 filters, which impose high static pressure on fans, thus raising the energy consumption and requiring expensive replacement filters. In addition, some HVAC systems, such as ductless mini-split units, cannot be provided with a MERV 13 filter due to the space required and the high static pressure.

In October 2017, Global Plasma Solutions (GPS) submitted their needlepoint bipolar ionization units to Blue Heaven Technologies, an independent 3rd party certification laboratory, to confirm the particle counts using a MERV 13 filter versus a MERV 8 filter combined with GPS'. GPS' is an active air purification technology that ionizes the particles in the space, thus agglomerating the particles, causing them to gain surface area. Once the surface area becomes sufficiently large, the airflow can push against the particle and bring it back to the filter for capture, thus dramatically reducing the space particle counts.

The test setup and protocol was as follows:

MERV 13 Test

- Used a standard AHAM size test space, approximately 8' x 8' x 10'
- Cigarette smoke was used to generate the particles during the test to achieve a high level of particles and a wide range of particle sizes
- The room was filtered using a ducted HEPA filter system to clear out the particles prior to injecting the cigarette smoke
- A MERV 13 filter was installed in a side stream ducted system to the room with an airflow of 1,200 CFM.
- Smoke was injected into the room with the total particle count reaching 2,730,958 and 3,812 particles/cm³ concentration
- The fan was energized and the space particle count reduction was observed
- The MERV 13 filter stopped reducing particle counts in the space after 30 minutes of operation and the test was stopped
- The final particle counts using the MERV 13 filter can be found in Table 1

MERV 8 + GPS

- Activated ducted HEPA filter system to clear out particles from the MERV 13 filter test
- Replaced the MERV 13 filter with the MERV 8 filter and energized the GPS technology mounted on the supply air duct after the MERV 8 filter.
- Smoke was injected into the room with a total particle count reaching 3,645,943 and 6,286 particles/cm³ concentration
- The fan was energized and the space particle count reduction was observed
- The MERV 8 filter + GPS technology continued to reduce particles over a period of 16 hours until the experiment had to end due to lab scheduling

	Particle Size (Microns)	Particle Quantity at Each Size													Total Particles	Concentration #/cm3
		0.3	0.4	0.55	0.7	1	1.3	1.6	2.2	3	4	5.5	7	10		
MERV 13 Filter	34 Minutes	636	101	25	23	8	5	2	5	1	2	0	0	0	808	0.81
MERV 8 Filter + GPS	960 Minutes	623	114	30	15	2	0	1	3	0	0	0	0	788	0.788	

Table 1

Based on this data, a MERV 8 filter + GPS technology can be used to achieve lower particle counts than a higher efficiency filter, saving energy and an owner’s money through avoiding the purchasing of higher cost MERV 13 filters. GPS technology has been used in clean rooms to make HEPA filters more efficient. Below is an example where a pharmaceutical manufacturer installed GPS’ technology to take care of an odor issue due to a new process, but they found out the technology also reduced their total particles to a lower level than ever achieved when the 3rd party outside lab validated their particle counts on an annual basis.

Total Particle Counts		
Date	Before	After
6/17/2013	2015	
6/25/2014		208*
Total Particle Count Reduction 89.7%		
*GPS-iBar installed & activated 6 months prior to “After” testing		