



What is the Difference Between Commercial Kitchen Pollution Control Units?

KitchenVentilation.com

Knowledge by **Halton**

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Background

- Commercial Kitchen Pollution Control Units: Systems that remove a high percentage of grease, vapor, and odors from the cooking process through a means of filtration.
- 2 major categories:
 - Media filter type
 - Electrostatic precipitators (ESP).
- Systems includes odor abatement technology
 - Commonly odor-neutralizing spray or activated carbon bed
- In addition, the system includes an exhaust fan to pull the grease-laden vapors through the filtration and odor abatement components



What is in the exhaust stream of a commercial cooking operation?



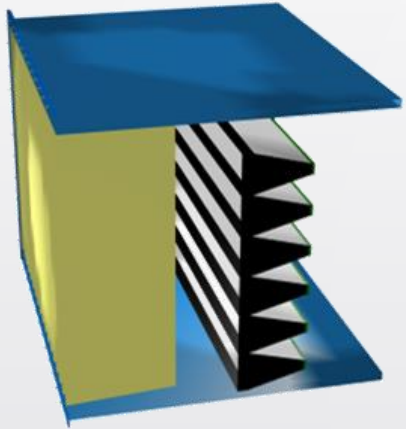
- Grease particulate of varying sizes
 - Ranging from vapor to large micron particulate,
 - Water vapor and volatile organic compounds ([VOC's](#)).
- Particulate distribution is process-dependent.
 - Example : Cooking 1000 lbs. of burgers on
 - Charbroiler
 - 55 lbs. of total emissions (on average).
 - Of that, about 62% is particulate and the balance vapor and VOC's.
 - Griddle
 - 17 lbs. of total emissions (on average).
 - Of that, about 65% would be particulate and the balance vapor and VOC's.
- The ability of a PCU to remove emissions is a function of the efficiency of the filtration.

Media Filter Units for Pollution Control Units

- Multiple filters in combination
- Typically 2 or 3 stages
 - Pre-filter to a bag filter, combined pre and bag filter, final stage filter.
 - Filters increase efficiency by stage.
- First stage: Applied to take out the larger grease particles
- Second stage: Removes slightly smaller grease particles
- Final stage: removes the smallest particles down to a fractional micron level.



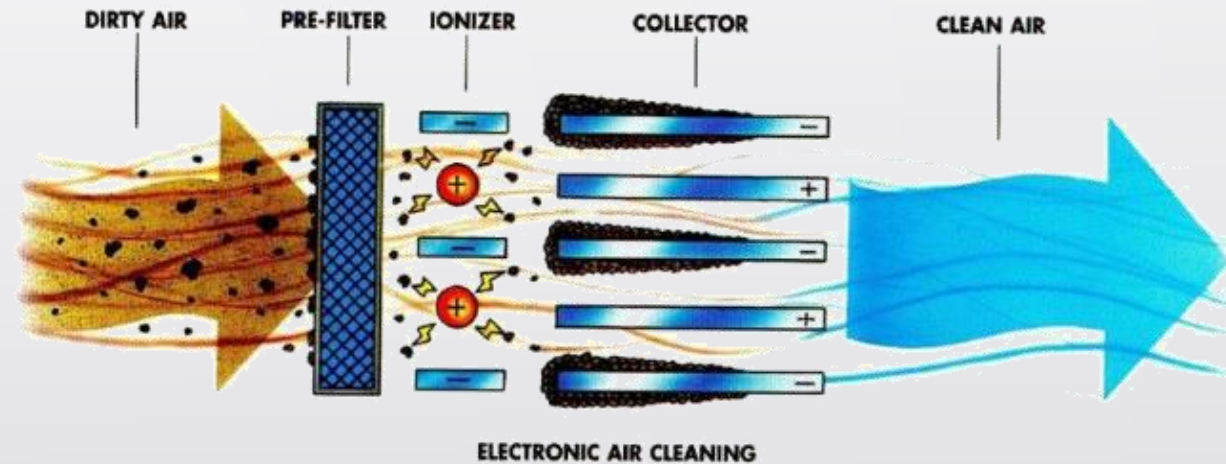
Media Filter Units for Pollution Control Units



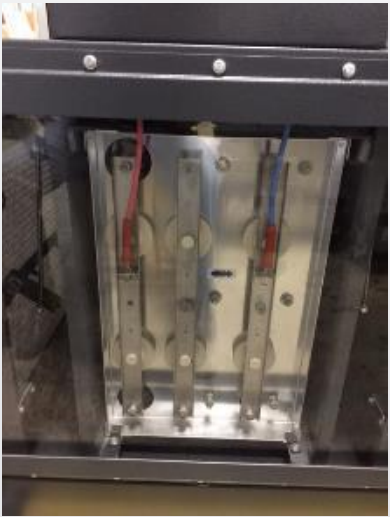
- Most systems have filter life monitoring
- Filter's load/pressure drop across the filter are measured to determine when the filter needs to be changed.
- Advanced filtering systems have variable frequency drives
 - Adjust fan speed as pressure loss increases
 - Helps maintain design exhaust airflow.
- Replacement filters used in scrubbers must be compatible with the application.
- First cost on filter type units is less than that of an ESP type
- Calculators are available from manufacturers to assess first and maintenance cost

ESP, Electrostatic Precipitators for Pollution Control Units

- Utilizes ionizing-collector cell
- Series of parallel plates in a frame about the size of a small trunk.
- Multiples of cells based on the total exhaust volume required.
- Ionizing electrode creates a positive charge.
- Secondary plates with additional positive charge w/ grounded plates between them.
- Positively charged grease is repelled to and collected on ground plates, removing grease from air stream.
- Efficiency of an ESP is related to
 - Surface area of the cells (more cell area, more grease collection)
 - Voltage gradient
 - Method of ionization.



ESP, Electrostatic Precipitators for Pollution Control Units



- Advanced systems have wash spray mechanism
 - Programmed to clean the collecting cells nightly.
 - Requires drain to grease trap and hot water connection.
 - Without wash system, manual cleaning of the cells is required
- High-volume operation should opt for wash system.
- Cells are taken out of the unit for periodic deep cleaning and inspection.
- Some systems use a wire as ionizing medium and are subject to breakage.
- ESP can come with coarse filters before and after the collecting cell
 - Prevents larger particulate from fouling the cell
 - Suppresses water mist from being pulled downstream after a wash

Odor Abatement for Commercial Kitchen Pollution Control Units

- 2 main odor abatement technologies:
 - Odor-neutralizing spray.
 - Injected into the clean air stream on a timing schedule.
 - Frequency of spray based on the volume of cooking.
 - Spray is consumable and must be replaced as it is depleted.
 - Activated carbon beds.
 - Air off the collecting cells passes through carbon bed.
 - Gases adsorbed by the carbon, reducing odor.
 - Most effective carbon tested is coconut shell.
 - Once carbon is depleted, must be replaced with fresh carbon.
- No method is 100% effective
- Use of these systems significantly reduces smoke and odors.





Contact the Experts

- Learn more about Halton Group's Media Filter and ESP Pollution Control Units along with their complete commercial kitchen line by going to <https://www.halton.com/products/pollution-control-unit-pst-na-en/>
- Contact the Technical Air Systems' Sales Engineering Team at **973-285-0333** or by email at solutions@technicalair.com
- Subscribe to Kitchen Ventilation: Knowledge by Halton by going to <https://kitchenventilation.com/subscribe-to-receive-commercial-kitchen-ventilation-blogs/>

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