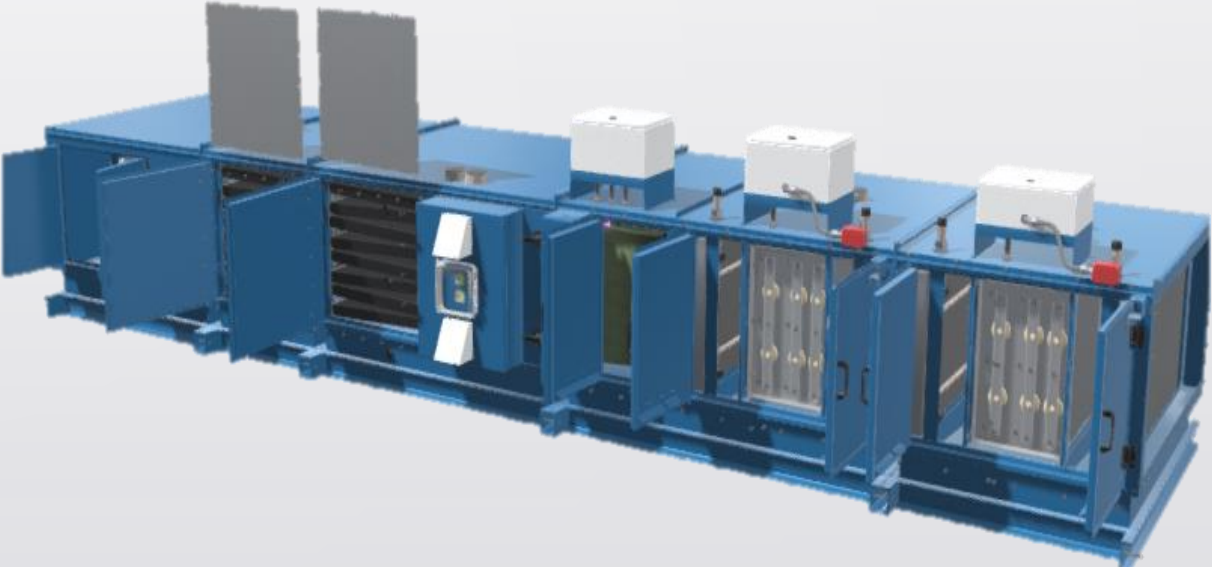




# What is the Difference Between Commercial Kitchen Pollution Control Units?



[HTTP://WWW.TECHNICALAIR.COM/EC-COMMERCIALKITCHENS](http://www.technicalair.com/ec-commercialkitchens)

# 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.

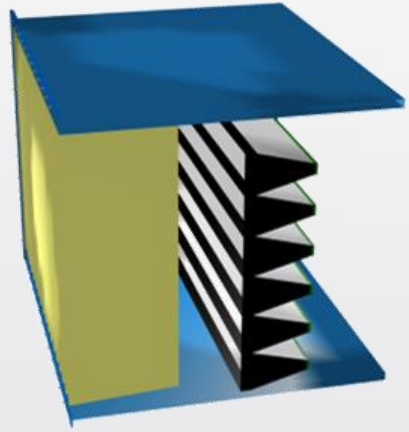


# Media Filter Units for Pollution Control Units

- 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

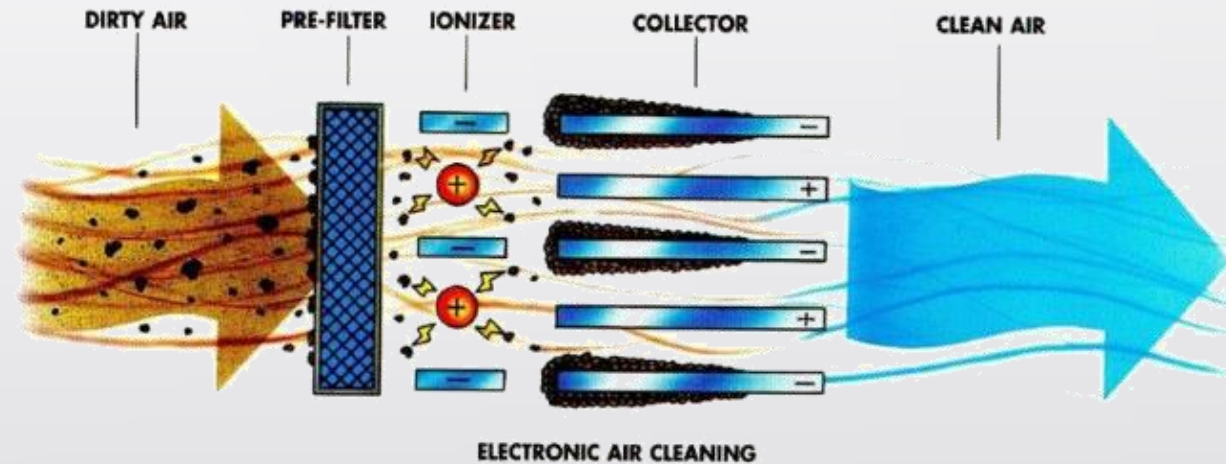


- Most systems have filter life monitoring
- Filter's load/pressure drop across the filter are measured to determine when the filter needs to be changed.
- Advanced filtering systems have variable frequency drives
  - Adjust fan speed as pressure loss increases
  - Helps maintain design exhaust airflow.
- 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

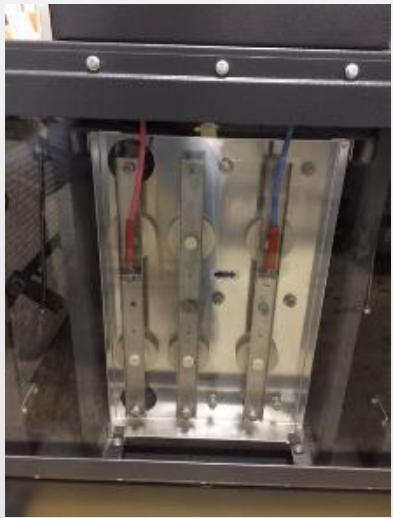
# ESP, Electrostatic Precipitators for Pollution Control Units



- 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 <http://www.technicalair.com/halton>
- Contact the Technical Air Systems' Sales Engineering Team at [973-285-0333](tel:973-285-0333) or by email at [solutions@technicalair.com](mailto:solutions@technicalair.com)
- Learn more about Technical Air Systems, Inc at <http://www.technicalair.com/>
- Read more article about Commercial Kitchens along with Air Handling & Air Distribution and Building Performance & Controls from the Engineering Corner: <https://bit.ly/techairEC>