

# How not to ruin a good thing, Make-up Air 101



**KITCHEN VENTILATION**

KNOWLEDGE BY *Halton*



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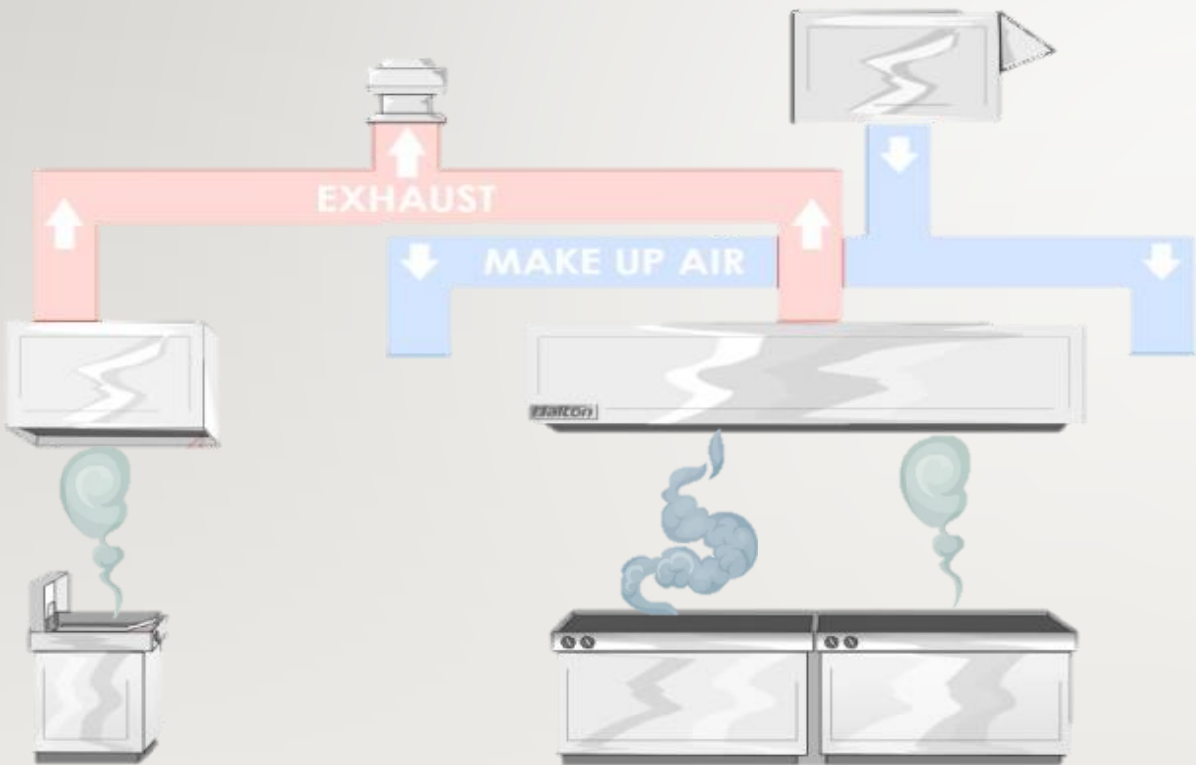
**ENGINEERING CORNER**

# Primer on the Operation of Commercial Kitchen Hoods

- Think about cooking burgers on a grill or char broiler
  - Produces plume of effluent and heat, rising upward
- The hood canopy is an upside-down box open to this plume
  - Captures the plume inside and extracts some of it through the grease filters as it passes them
- During cooking, bursts of heat and effluent can be too much for the filters to handle
  - Some of this plume doesn't even get near the filters
- The "box" part of the hood contains the leftovers until they can be sucked through the filters and removed



# Sabotaging Hood Performance through MUA

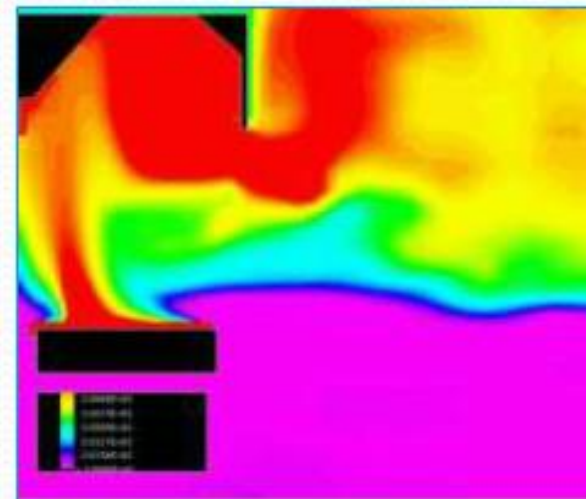


- Make-up air brought into a kitchen needs to be distributed through louvers, vents, diffusers, plenums, etc.
- It's not good practice to "dump" the air in the space through a duct with nothing on the end
- The choice of where to introduce this air and how to introduce it is critical
- If we have velocities that exceed 50-75 fpm at the hood lip, it's a virtual guarantee the hood won't work properly
  - Even at extremely high exhaust rates
- Review is needed on how the make-up air is being introduced
  - Determine if this could be a cause for poor performance

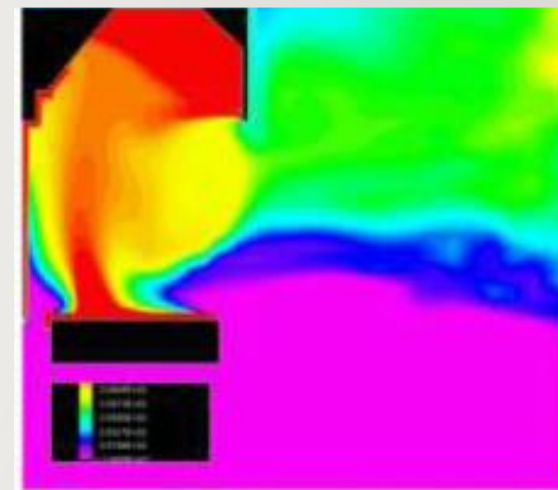


# Effluent “Lean” or Bend

- Cooking effluent and heat can “lean” or bend in one direction or another and find its way outside the perimeter of the hood
- Increasing the airflow through the hood will not bring that smoke, grease, and heat magically into a vertical plume and rise into the hood box
- It will frustrate the situation further since it’s likely due to make-up air introduction or uneven space pressurization (also make-up air-related) creating the problem



“Lean”



Contained

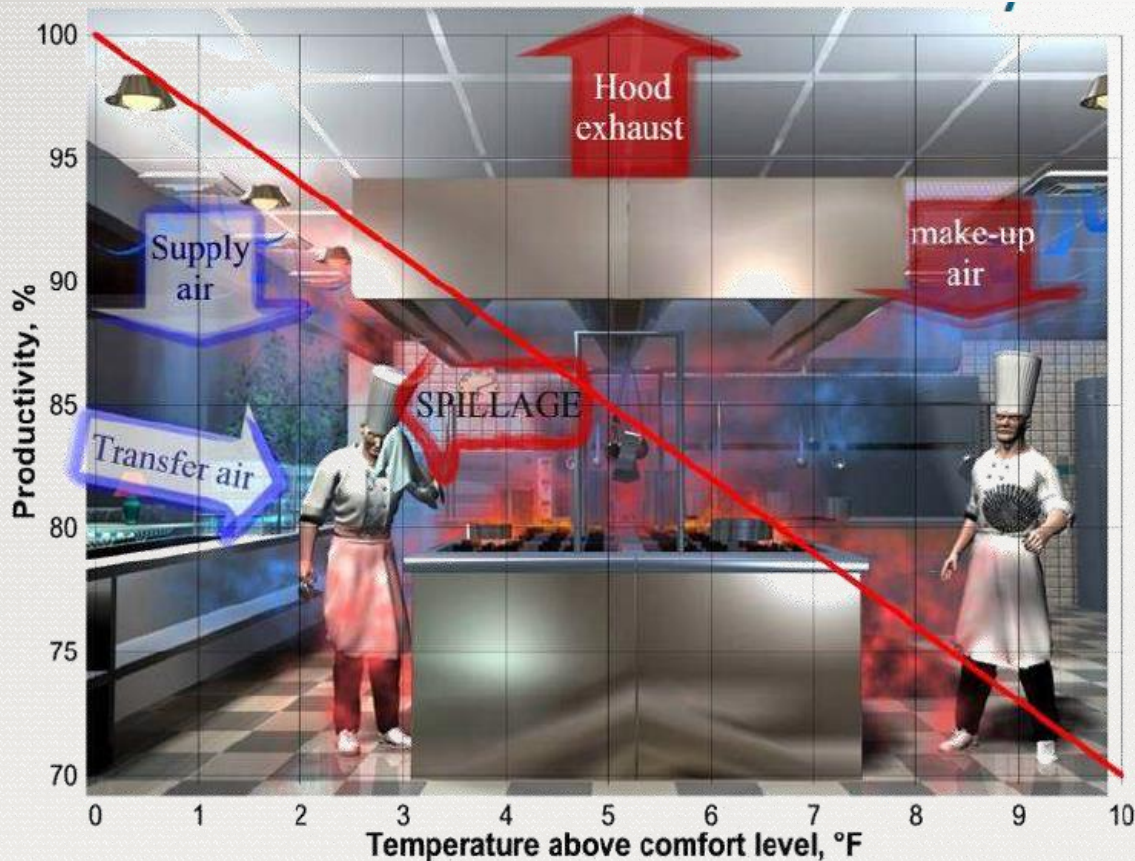
# Hood Enemy #1- Four-way diffusers



- 4-way diffusers don't belong in a kitchen.
  - They were developed for office buildings
- If used in a kitchen, they need to be at least 15 feet away from any hoods
  - Should actually be a three, two- or one-way diffuser that blows away from the hood
- If the air discharged is blown toward the hood, the smoky thermal plume will blow out from under the hood or create a low-pressure zone just outside the hood lip
  - Naturally competes with the hood for the plume's attention
- When the exhaust is increased to rectify a capture and containment issue that stems from a make-up air problem like this, you need more make-up air
- If you need more make-up air, the problem gets worse, and a seemingly endless cycle of increasing exhaust and make-up air flows ensues



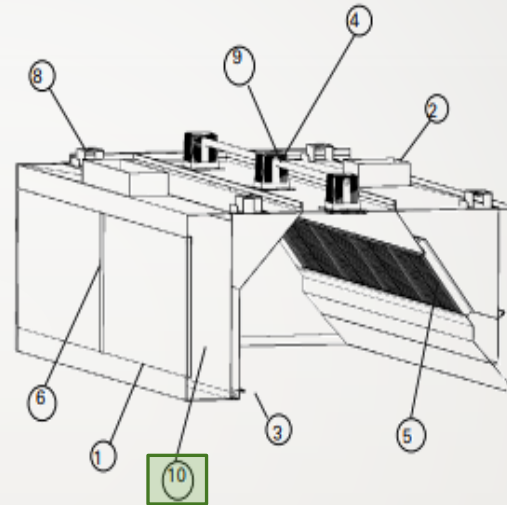
# Variables in Make-up Air



- Hood performance may be adequate one day and poor the next.
  - Due to behavioral differences at different temperatures
    - In summer, warm air will tend to stay aloft in and not drop toward the floor.
    - In the winter, cooler air will tend to move toward the floor and not stay near the ceiling.
- At certain temperature points, the air jet leaving the diffusers is like pointing a fan at the cooking process and moving it up and down,
  - Eventually hitting the sweet spot where it disrupts everything
- Varying airflows due to demand controlled kitchen ventilation can cause additional performance issues

# Methods of Introducing Make-up Air

- Many hood manufacturers offer their own methods of introducing make-up air
  - Usually through low-velocity perforated panels on, or in front of, their hoods
  - Prefer to introduce the space-balancing make-up air without disruption to the capture and containment process
- Some manufacturers have alternative specialty diffusers for use in the kitchen area
  - Minimizes the impact of the make-up air introduction



Part	Description
1	18 Ga. Stainless steel AISI 304
2	Exhaust duct collar
3	Capture Jet air
4	Light fixture
5	KSA grease filters
6	Integrated Capture Jet fan intake (not visible in picture)
7	Grease collection cup
8	Assembly brackets
9	Double wall construction
10	Integrated Supply air plenum



Specialized Kitchen Ceiling Diffuser



# Contact the Experts

- Learn more about Halton Group's Make-up Air 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 or by email at [solutions@technicalair.com](mailto:solutions@technicalair.com)
- Learn more about Technical Air Systems, Inc at <http://www.technicalair.com/>
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