

# Rebalance Your Short-Circuit Hoods and Save 300 Percent in Fan Energy

If you formerly bought or presently buy short-circuit hoods, this article is for you.

Short-circuit hoods made sense many years ago, when prescriptive codes required that you exhaust 100 cfm per square foot of open area for a wall canopy hood. Many people realized this high exhaust rate might make sense for a hood serving a broiler but that it was overkill for most hoods serving lighter-duty cooking appliances.

Manufacturers temporarily outsmarted these codes by adding a supply chamber to their hoods that could 'short-circuit' up to 70 percent of the exhaust. In other words, rather than throw away 100 cfm per square foot from the kitchen, they would only throw away, say 50 cfm per square foot—with the other 50 cfm coming from the outside via a supply fan.

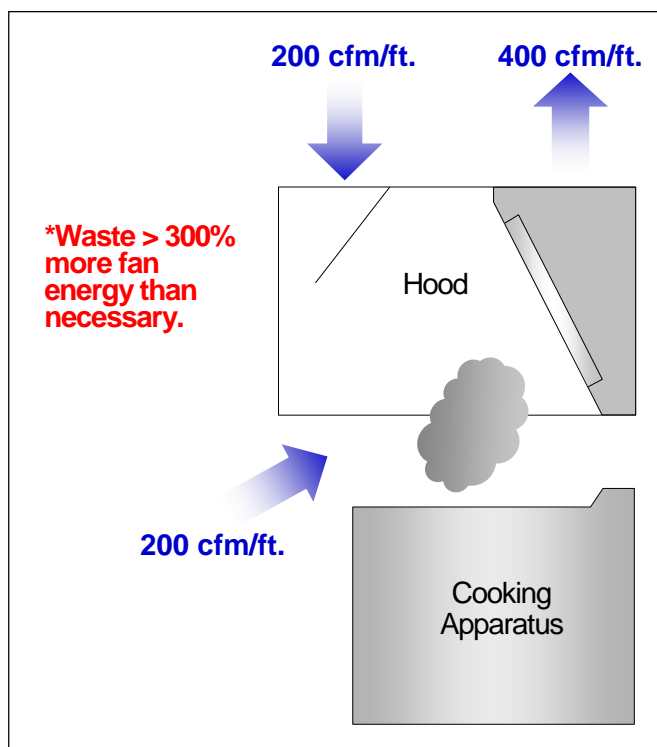
Fortunately, over time the codes became more performance-based, and they no longer prescribe a minimum exhaust rate as long as

one buys a listed hood that has been tested for the different cooking load classifications. As a result, most foodservice operators have stopped specifying short-circuit hoods and are able to size their fans to exhaust only what is necessary.

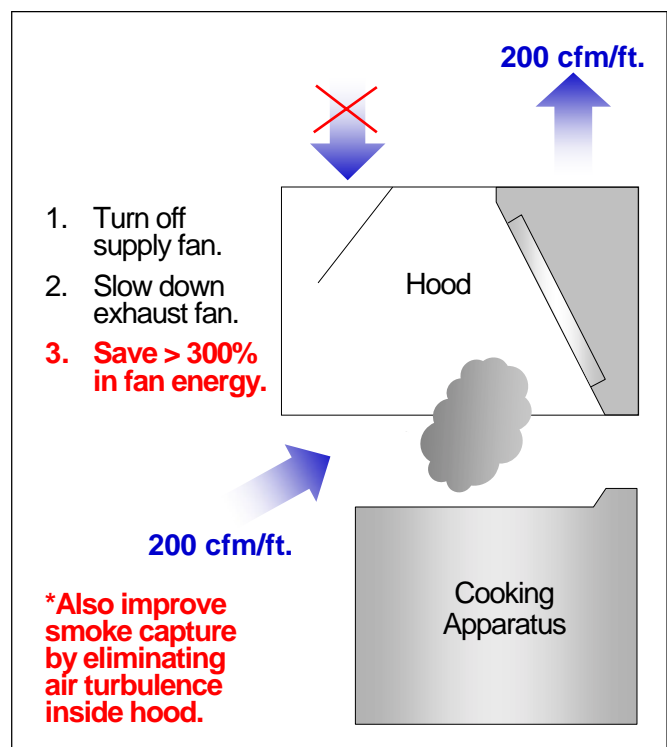
The first-cost benefits of exhaust-only hoods are convincing enough: no supply fans, supply ducts, and supply chambers to buy; and smaller exhaust fans. The operating cost-benefits are all the more convincing: no supply fan to operate, and smaller exhaust fans to operate—which translate into huge fan energy savings!

In fact, exhaust-only hoods reduce fan energy consumption about 300 percent compared to short-circuit hoods. Refer to the diagram below as an example. A short-circuit hood exhausting 400 cfm per lineal foot and supplying 200 cfm per lineal foot is actually only removing 200 cfm per lineal foot from the kitchen. The obvious question becomes: Why

## Short-Circuit Hoods



## Exhaust-Only Hoods



not just exhaust 200 cfm per lineal foot in the first place?

Think of the fan energy savings associated with only 'moving' 200 cfm per lineal foot of hood compared to 600 cfm (400 + 200) per lineal foot of hood. The hood fans will instantly be 3 times or 300 percent more energy efficient. Actually, the savings will be even greater because there is an exponential (cube) relationship between fan speed and brake horsepower.

The diagram also shows how existing short-circuit hoods can be 'rebalanced' as more energy-efficient exhaust-only hoods. Simply turn off the supply fans and slow down the exhaust fans until the net exhaust is the same as it was before. This will not only save significant fan energy, it will improve smoke capture by eliminating air turbulence inside the hood.

A national air balancing firm uniquely qualified and capable of performing this service is Melink Corporation. Melink, based in Cincinnati, Ohio, has highly trained technicians located across the country. Specifically, the company will turn off the supply fans and then purchase, install, and adjust new belts and pulleys on your exhaust fans. Finally, Melink will retest the hoods for proper smoke capture, and also recheck the rooftop unit outside air quantities to ensure the store ends up with a slight positive pressure.

(It should be noted that some people may think the air velocity in exhaust ducts cannot be reduced below 1500 fpm. But NFPA 96 reduced

this minimum velocity to 500 fpm a few years ago based on research conducted by the University of Minnesota, and the International Mechanical Code adopted this change soon thereafter.)

The cost to rebalance existing stores is about the same as new stores. But the payback can be as quick as 6 months because of the reduced fan energy consumption. Maintenance will also be reduced since the supply fan belts, filters, and supply plenums will no longer need to be replaced or cleaned.

Brinker International, based in Dallas, Texas, serves as an excellent case study. The company switched from short-circuit hoods to exhaust-only hoods for new construction several years ago and are now rebalancing their older stores for the same reasons. Brinker hired Melink to perform this rebalance work, and to date almost 100 stores have been completed. This means there are almost 200 supply fans that are no longer operating needlessly and more than 400 exhaust fans that are operating at reduced speeds with significantly lower amp draws. It also means better smoke capture for 400 hoods and zero maintenance required for 200 fans.

Think of the energy impact this would make if all restaurants operators applied these valuable lessons.

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