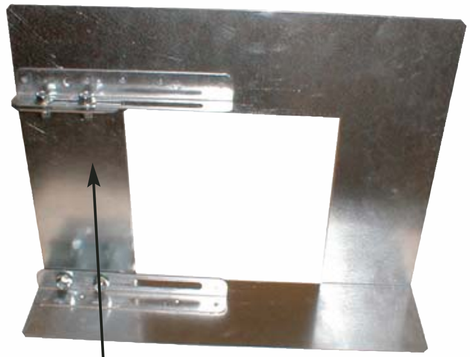
Exhaust Air Balancing

EABB – Exhaust Air Balancing Baffle

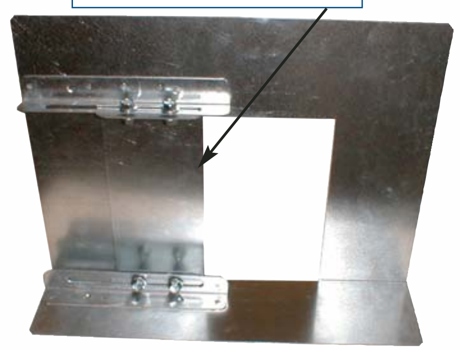
The Problem

Kitchen Ventilation Systems of today frequently face the common problem of balancing airflow within the kitchen area. Anytime a specific application includes multiple exhaust hoods connected to a common exhaust fan, the setting presents one of the most difficult ventilation balancing challenges. NFPA96 does not allow dampers in the kitchen exhaust duct. The kitchen layout may include a long cooking line with multiple hood sections that vary in regards to the loads under each hood section. All hood sections are forced to default to the highest static pressure, regardless of specific load under the hood section. Excessive exhaust rates for certain hood sections equate to wasted energy and increased operating costs for the customer.



Baffle 100% Open

Easy sliding baffle, with quick adjusting fastener.



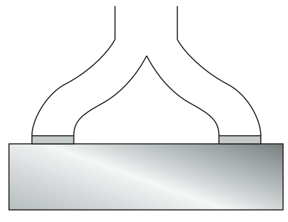
Baffle 50% Open

The Solution

Greenheck's new multiple hood balancing baffle provides the solution for all future kitchen exhaust balancing problems. The balancing baffle is UL 710 Listed for balancing airflow at the exhaust collar of the hood. This new balancing baffle allows the adjustment of each hood section according to it's respective static pressure, correctly balancing exhaust cfm and reducing operating costs for the customer. Located in the exhaust plenum behind the filters, the baffle accurately adjusts to ensure proper exhaust air flow for capture and containment of cooking effluent of each hood section. Providing the owner with a balanced system with no capture problems.

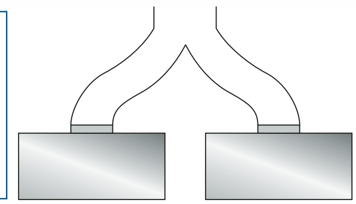
EABB Specification

Provide a Greenheck hood model _ _ _ _ with a UL/ULC listed exhaust air balancing baffle constructed of 18 gauge galvanized steel (stainless steel optional) for optimum balancing of multiple hood systems. Baffle(s) shall be accessible through the exhaust plenum for easy adjustment of air-flows.



Use the EABB on a hood that has two duct collars and needs different airflows at the ends of the hood depending on the cooking equipment.

Use the EABB on a system that has two hoods connected to one fan. The EABB would allow you to balance the two hoods individually.



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The Solution Company.

November 2003

Guide to Understanding Duct Collar Static Pressure Adjustment with the Exhaust Air Balancing Baffle (EABB)

This is a guide to assist in determining if multiple hoods on one fan can be balanced to have equal static pressure. For multiple hoods on one fan to achieve their designed exhaust flow, all of the hoods must have equal static pressure at their designed exhaust flow.

The laws of physics force the static pressure for each branch of a duct system on one fan to always be equal. This will happen by the flow rate increasing in low static branches and decreasing in high static branches until the static pressure is equal in all branches.

Checking for Balance

Every hood with an EABB has a range for its static pressure. The low number in this range is given by the standard calculation for hood static. (Static that is printed with the CAPS submittal.) The maximum increase above the low number can be calculated from the duct velocity at the low static. (Also given on CAPS submittal) This is then added to the low number to get the highest static pressure possible with an EABB.

The maximum potential increase in static is given in the graph, or can be calculated from:

Max. Inc. $=0.00000036 \times (\text{Duct velocity})^2$

After the range for each hood is calculated, it should be compared to the hood with the highest static pressure. If the highest hood falls inside of the range, then the hoods can be balanced with the EABB. If it is higher than the range, the hoods can not be balanced.

Example 1:

Hood 1: Ps = 0.58 inH_2O
Duct Velocity = 1900 fpm

Hood 2: Ps = 0.44 inH_2O
Duct Velocity = 1800 fpm

Hood 2 has the lower Ps, at 1800 fpm the maximum increase in Ps is 1.17. The range for hood 2 is 0.44 to 1.61. Hood 1 is less than 1.61 so these hoods can be balanced.

Example 2:

Hood 3: Ps = 2.00 inH_2O
Duct Velocity = 2000 fpm

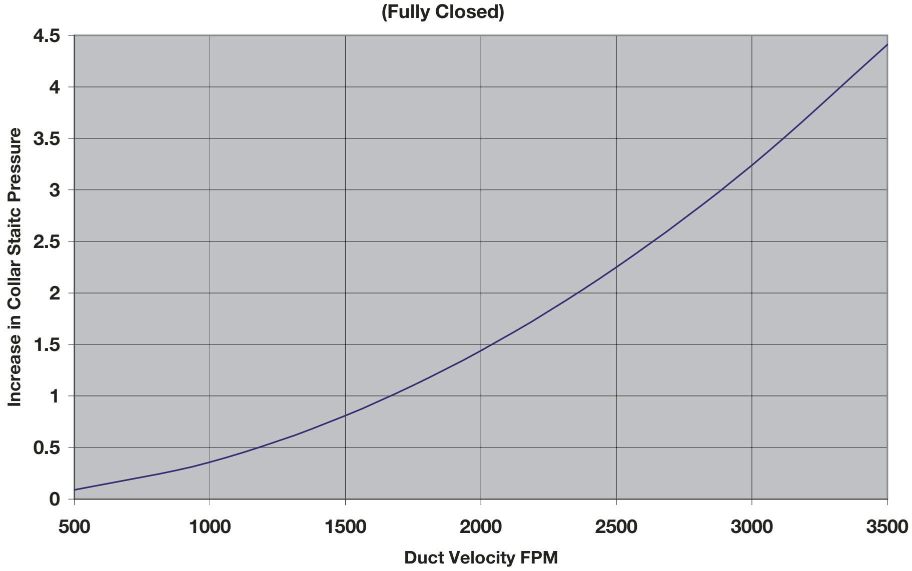
Hood 4: Ps = 0.44 inH_2O
Duct Velocity = 1500 fpm

Hood 4 has the lower Ps, at 1500 fpm the maximum increase in Ps is .81. The range for hood 4 is 0.44 to 1.25. Hood 3 is higher than 1.25 so these hoods can not be balanced.

Note 1: For many systems, an EABB may not be needed on the hood that has the highest static pressure. The exception to this is if the individual ductwork has uneven static pressures.

Note 2: When sizing the fan, use the static pressure from the highest hood and sum the cfm from all the hoods.

Maximum Increase in Static Pressure for Exhaust Air Balancing Baffle (Fully Closed)



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