



DN
REVLOW
Maintenance Manual

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2010 Update

DN REVLOW Maintenance and Operating Manual

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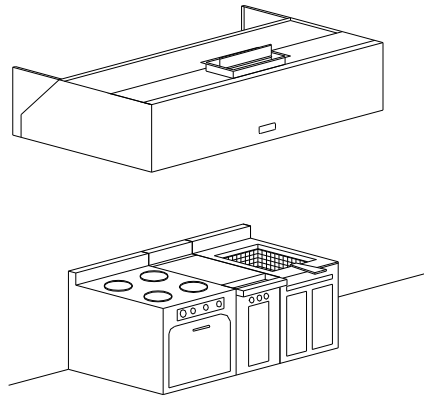
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INTRODUCTION

Thank you for selecting a SPRING AIR SYSTEMS INC. Commercial kitchen exhaust RevLow dry extractor. Your system consists of a dry extractor, exhaust fan and on/off switch. Others may have supplied the exhaust fan and on/off operator.

Your SPRING AIR SYSTEMS INC. Dry extractor model was selected to best meet the design requirements of your commercial kitchen application.

The DN series dry ventilator is a UL/ULC listed “Exhaust Hood without Exhaust Fire Damper”.



*Typical SPRING AIR SYSTEMS Dry RevLow Ventilator Installation
Figure 1*

An ON/OFF selector switch located in the kitchen area or mounted on the exhaust fan starter coil electrical enclosure normally controls the exhaust fan.

SPRING AIR SYSTEMS HOOD MODEL NUMBER DESIGNATIONS

There are numerous types and styles of SPRING AIR SYSTEM RevLow ventilator available. Refer to the UL/ULC label for the complete model number and exhaust flow requirement for your dry ventilator. The UL/ULC label is located on the underside of the grease through on the right hand side of the dry ventilator.

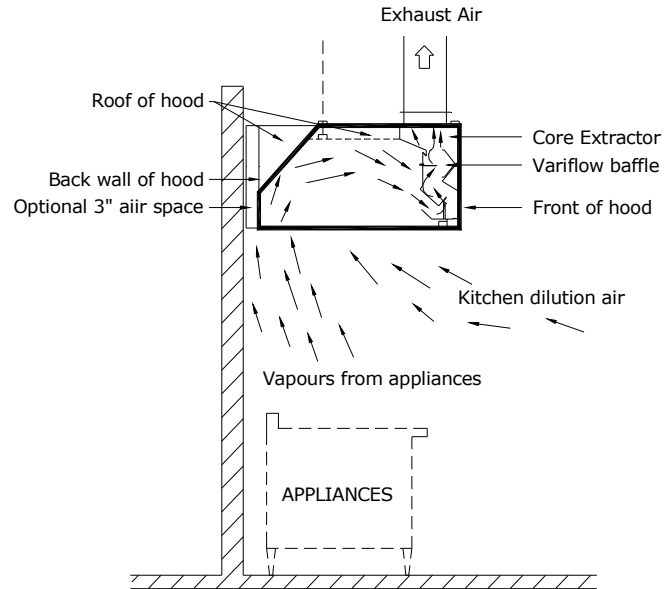
SPRING AIR SYSTEMS HOOD MODEL NUMBER DESIGNATIONS

D	Dry Grease Extractor	D	N	B-F	MP	10	4
N	No exhaust fire damper						
D	Fusible link, dead weight fire damper						
B-F	Box type rev-low hood						
MG	Make up air through front grilles						
MP	Make up air through perforated panels						
MC	Make up air down discharge through perforated						
MR	Make up air through rear wall plenum						
10	The length of the ventilator in feet						
4	The width of the ventilator in feet						

Model Number Designation – Ventilators Chart No1

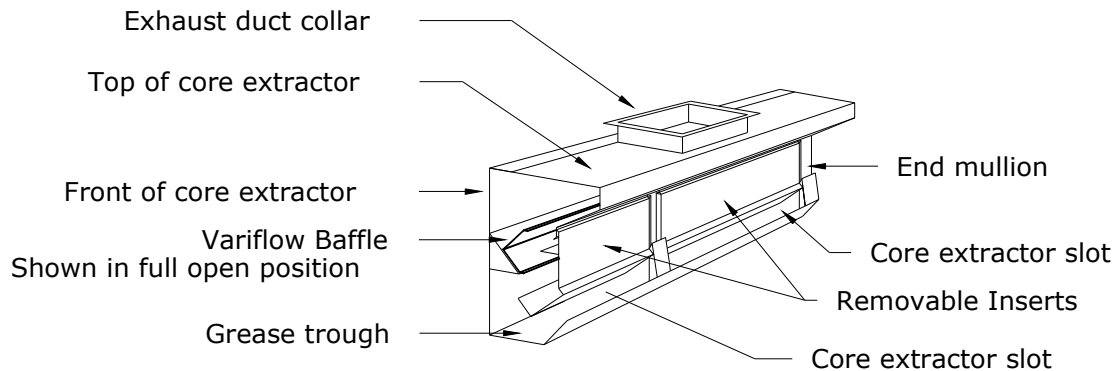
PRINCIPLE OF OPERATION

A commercial kitchen cooking line consists of many different appliances depending on the type of restaurant or institution. In every commercial kitchen the cooking vapors that comprise of grease, smoke, and products of combustion rise off the cooking surface. Natural convection forces drive the cooking vapors up towards the back wall as shown in figure 2. The kitchen dilution air is entrained into the cooking vapors and the air mixture generally follows the profile of the back and top of the hood. The mixture of grease, smoke, products of combustion, lint, dirt and kitchen dilution air proceed along the roof of the hood and follow a path down towards the core extractor slot (the core extractor slot extends along the length of the hood). Most of the air mixture enters the slot and a small amount rolls back into the hood canopy to meet the main air stream again.



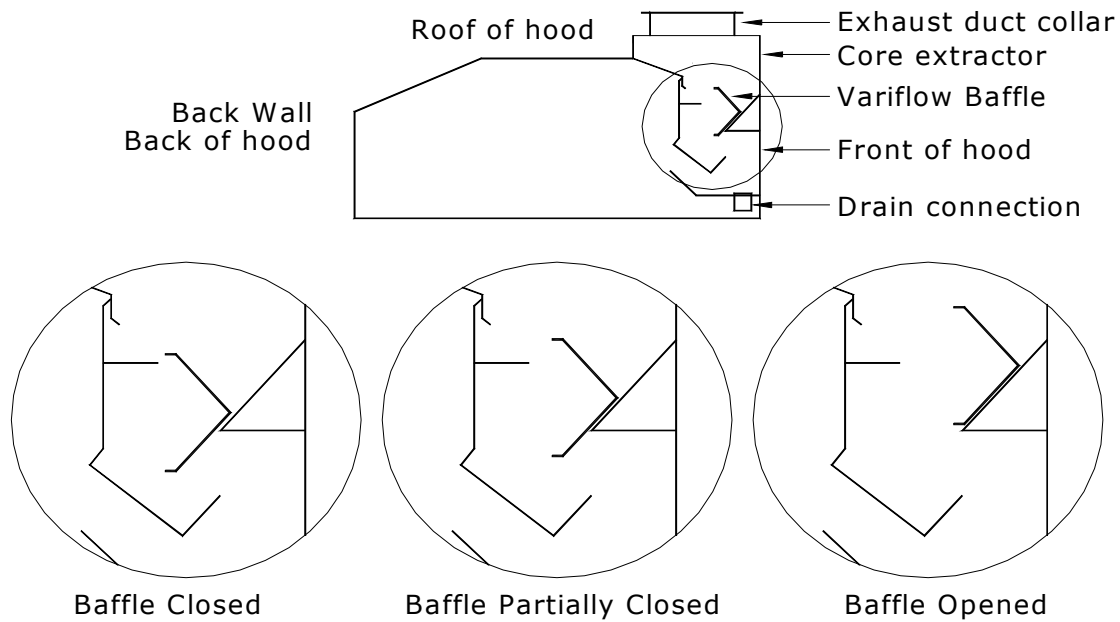
*The RevLow Hood Model DN-B-F
Figure 2*

Optimizing the amount of air mixture that enters the core extractor slot is the key to the RevLow system. The RevLow hood must incrementally maximize the amount of the air mixture that enters the slot and minimize the amount of roll back into the canopy as the total amount of the air mixture deviates along the length of the cooking lineup.



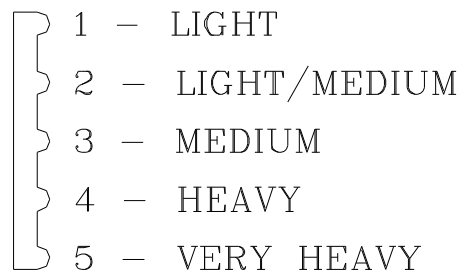
*Section View of Core Extractor for DN-B-F RevLow Hood
Figure 3*

The RevLow accomplishes this complicated process with a unique core extractor profile that contains a series of specially designed Variflow baffles located along length of the core extractor. See Figure 3 above. The Variflow baffles are adjusted prior to shipment to allow the optimum amount of the air mixture to enter the core extractor slot and thereby minimize roll back into the hood canopy. For instance the Variflow baffles located above a Charbroiler are opened to the maximum 450 CFM/ft position and the Variflow baffles located above ovens or steamers are closed to the minimum 90 CFM/ft position. This variable adjustment along the length of each hood provides an exhaust system that truly minimizes the amount of exhaust air to properly ventilate any kitchen line up.



Section View of RevLow Extractor with Detail of Variflow Baffle
Figure 4

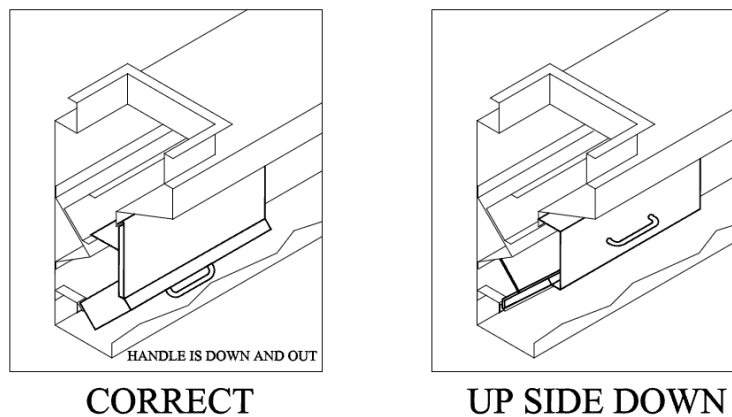
BAFFLE SETTINGS



Variflow Baffle labeling
Figure 5

Each baffle is factory set based on the type of appliance under the hood.

REMOVEABLE INSERT INSTALLATION

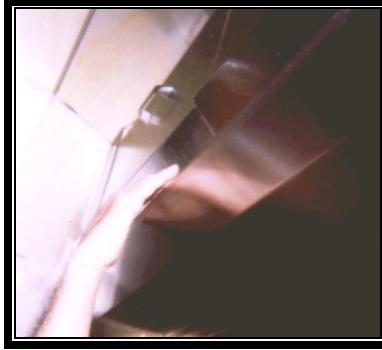


REVLOW MAINTENANCE INSTRUCTIONS

Hood with Spring Air Systems RPD Controller {TruFlow Control Panel}

At the start of the day

1. Rotate the occupied/Unoccupied switch to the occupied position to start the exhaust system *{Touch the fan on/off icon on the **Power** window if system is not setup on automatic start/stop schedule}*. The exhaust fan(s) will turn on and after a minute time delay the supply unit(s) will turn on.
2. Check each hood for air movement in the slot. Put your hand up to the entrance of the slot and feel if there is air movement. The air movement should feel the strongest over the heavy appliances. (broilers)



Check Air Flow in slot

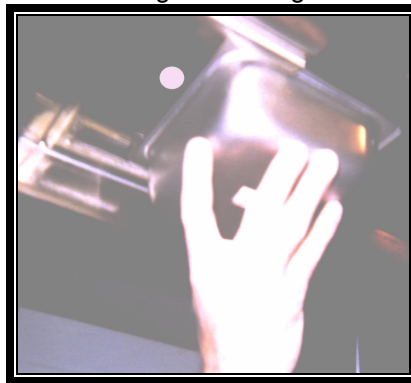
3. If there is no air movement check if the green fan light on the Spring Air remote panel is on (If not check the breaker panel or fuse), check if the motor starters have pulled in (Press the red reset button), and finally check fan belts in exhaust fan(s) on the roof. *{TruFlow systems – check **Operation Status** window for messages}*. If necessary, call a service technician.
4. Go to the makeup air diffusers and check for air movement from the supply unit. If no air movement check, motor starter (push red reset button), check fan belts on unit on roof. *{TruFlow systems – check **Operation Status** window for messages}*. If necessary, call a service technician.
5. Check that all the grease inserts are in the hoods and installed properly.

At the end of the day

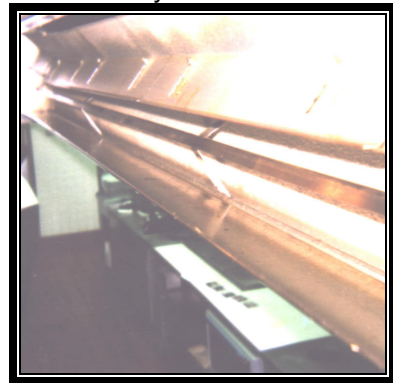
1. After the cooking equipment has been turned off rotate the occupied/Unoccupied switch to the unoccupied position to shut off the exhaust system. *{Touch the fan on/off icon on the **Power** window if system is not setup on automatic start/stop schedule}* The exhaust and supply fan(s) will shut down.
2. The RevLow hood will deposit particulate on both the hood backwall and roof. Wipe down the stainless steel backwall above the appliances and the interior of the hood, including the back and roof. Use a recognized hood degreaser. Wipe down the underside of the grease trough. This is located directly above the cooks' head.



Wipe Interior of Hood



Empty Grease Cup



Steam Clean Interior

At the end of every other cooking day

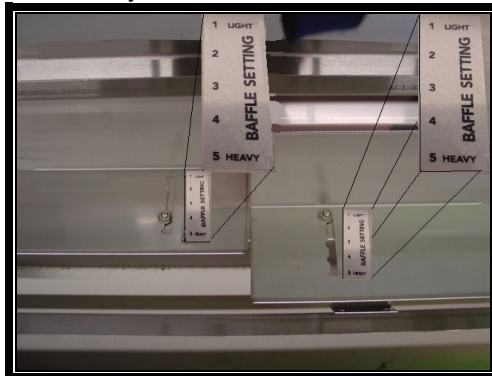
1. Empty the grease cups located under the grease trough.
2. Remove the grease inserts and wash in a dishwasher or pot sink. . Use a recognized hood degreaser and clean to bare metal.
3. Replace the insert in the hood.

At the end of the cooking day every six months

1. After removing the grease inserts for cleaning check the position of the Variflow Baffles in the hood. The Variflow Baffles should be open over the heavy equipment and closed over the lighter equipment. (Baffles should be wide open over charbroilers and closed over ovens).
2. Steam clean the interior of the grease extractor
3. Go to the roof and check the condition of the exhaust fan and makeup air fan belts. Tighten or replace as necessary.
4. Replace the makeup air filters. (Filter replacement times will vary with location of the restaurant).



Inspect Baffle Positions



Check Baffle Setting

CLEANING THE EXTERIOR

Normal soil can be removed with a mild detergent and water mixture applied to a cloth. To remove baked on grease, apply a cleanser to a damp cloth or sponge and rub on the metal in the direction of the polishing lines. DO NOT RUB IN A CIRCULAR MOTION.

Burnt deposits, which do not respond, can usually be removed by rubbing the surface with a SCOTCH-BRITE scouring pad of STAINLESS scouring pads. DO NOT USE ORDINARY STEEL WOOL.

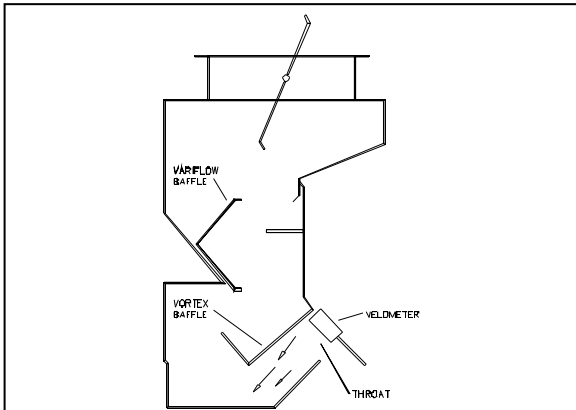
Heat tint can be removed by a vigorous scouring in the direction of the polish lines using a SCOTCH BRITE of STAINLESS scouring pad in conjunction with a powdered cleanser.

TROUBLE SHOOTING

- | | | |
|---------|-------|--|
| Low air | (i) | Improper exhaust fan rotation. |
| | (ii) | Broken or slipping belt. |
| | (iii) | Exhaust ductwork inspection door open. |
| | (iv) | Obstruction in the ductwork. |
| | (iv) | Flow-flow baffle must be adjusted |
| No Air | (i) | Broken belt. |
| | (ii) | Exhaust fan overload tripped. |
| | (iii) | Exhaust fan disconnect open. |
| | (iv) | Exhaust fan motor fuse blown. |
| | (v) | Fire damper closed. |
| | (vi) | Check if baffles are upside down in extractor. |

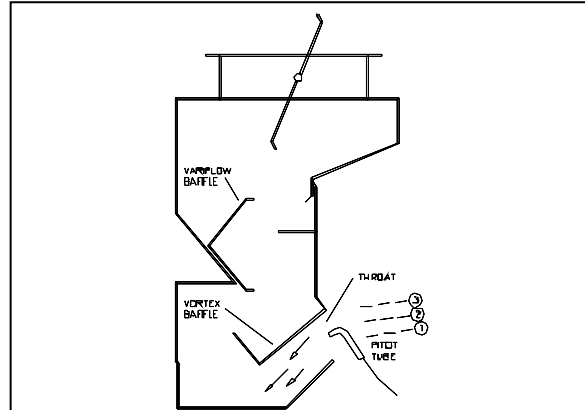
MEASURING THE EXHAUST AIRFLOW

The exhaust air is measured along the inlet slot of the ventilator. To ensure accurate results take a reading every foot along the length of the ventilator is recommended.



VANAXIAL VELOMETER

Hold the instrument perpendicular to the VORTEX BAFFLE and parallel to the throat (inlet slot) of the ventilator. Velometer should not exceed three inches in diameter. Take one measurement per insert.



PITOT TUBE OR ANEMOMETER

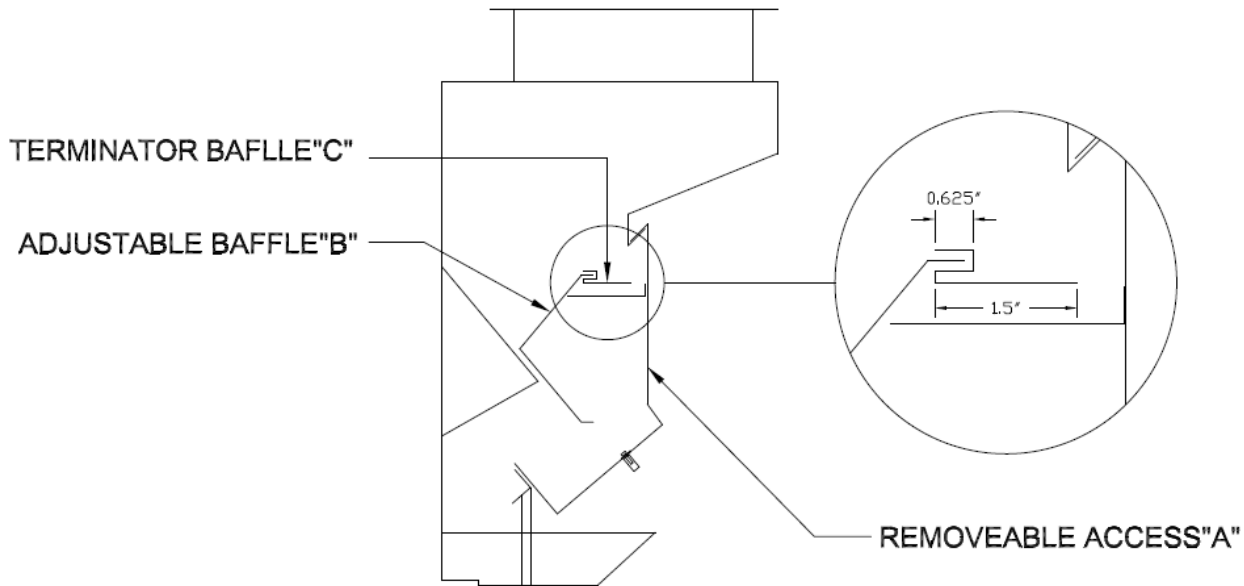
Hold the instrument perpendicular to the VORTEX BAFFLE and parallel to the throat (inlet slot) of the ventilator. Take three readings across the throat and average the results per insert.

Calculating the Exhaust Air

Calculate the average velocity across the inlet slot. Refer to the chart below for the corresponding CFM/ft (l/s/m).

Ventilator Type	Velocity		Exhaust Air Volume	
	Fpm	m/s	CFM/ft	l/s/m
DN-B-F/DN-DI	450	2.3	100	140
DN-B-F/DN-DI	675	3.4	150	210
DN-B-F/DN-DI	900	4.6	200	275
DN-B-F/DN-DI	1125	5.7	250	340
DN-B-F/DN-DI	1350	6.9	300	410
DN-B-F/DN-DI	1575	8.0	350	480
DN-B-F/DN-DI	1800	9.2	400	550
DN-B-F/DN-DI	2000	10.2	450	620
DN-B-F/DN-DI	2250	11.5	500	690
DN-B-F/DN-DI	2450	12.5	550	755

INSTALLING THE TERMINATOR BAFFLE

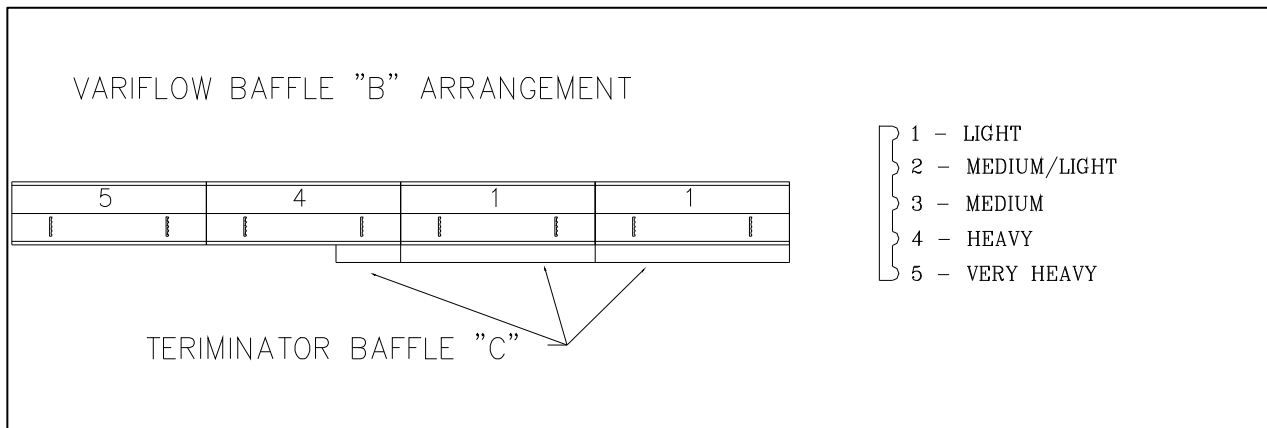


The TBDD Terminator baffle is available in various lengths to suit adverse site conditions. This will provide additional exhaust air over heavy appliances that are being effected by the surrounding environment.

Installation:

Remove the TBDD from the packing material. Take off all of the Removable Access Doors “A” from the hood. You should be able to clearly see all the adjustable baffles “B” and their settings. Ensure that the adjustable baffle(s) “B” over the heavy appliance is set at 5, or 3 if the baffle is directly beneath the exhaust duct collar. The TBDD baffles “C” are going to be installed on the adjustable baffles “B” over the light appliances. To install the TBDD baffle “C” onto the adjustable baffle “B” simply line up the gap on the TBDD baffle “C” with the lower end of baffle “B”. Tap the TBDD along the length until it is snug on baffle “B”. If the fit is loose remove the TBDD baffle “C” and gently tap the gap with a hammer in the middle and at each end. Re-attach to baffle “B”.

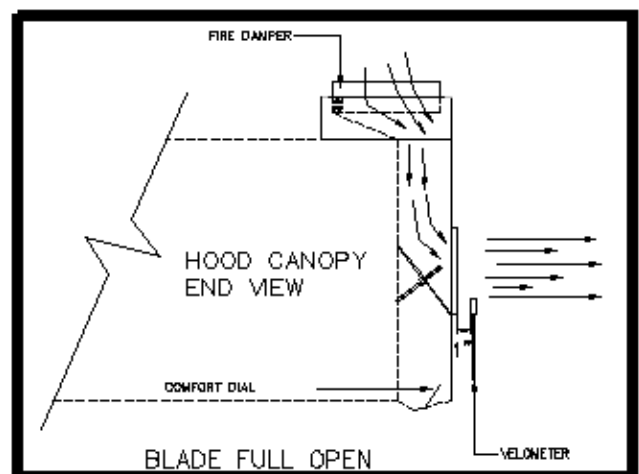
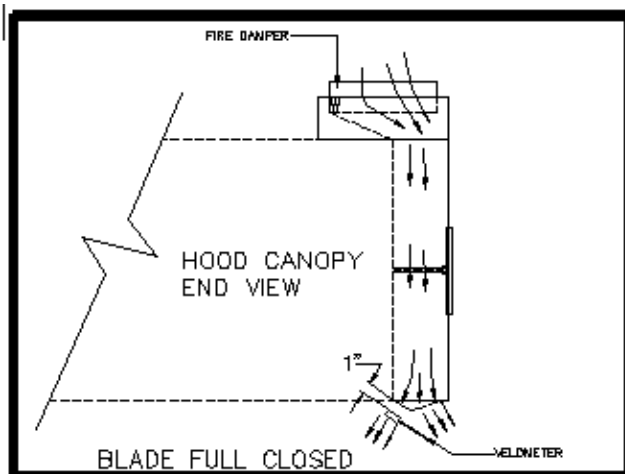
Install these baffles on the two adjustable baffles “B” located on the right or left side of the charbroiler (when looking from the front of the hood).



MEASURING THE SUPPLY AIRFLOW - MB

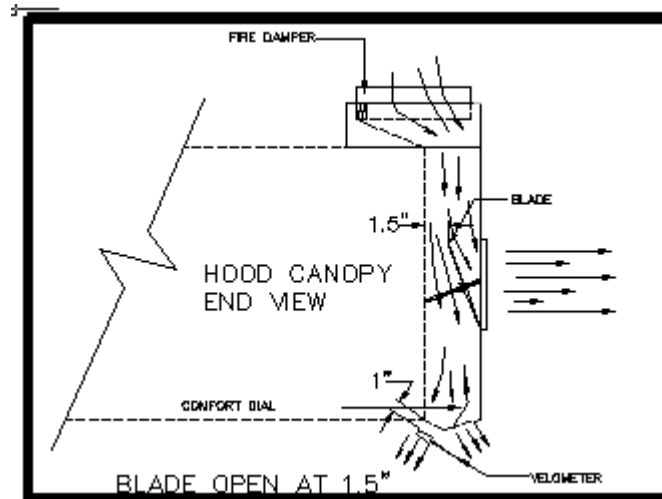
Measuring the total supply fan airflow through the Blade:

- ___1. Remove Blade front discharge perforated panel with appropriate tools.
- ___2. Turn Blade's threaded rod counter-clockwise until the Blade comes to a fully open position, which is required to determine the total supply volume at each hood.
- ___3. Turn supply fan on.
- ___4. Re-install Blade front discharge perforated plate with appropriate tools.
- ___5. Take velocity reading across the perforated plate as shown in the diagram below. Take two vertical readings, one at 2" from the bottom of perforation and one at 4". Repeat these horizontal readings every 12" along the hood.
- ___6. Total all readings and divide by the number of reading to determine the average velocity.
- ___7. Multiply the average velocity x 72 x length of perforated panel (in inches) to determine the total CFM per perforated panel. (It is critical to take the velocity readings 1" off the surface of the perforated panel to use this formula).
- ___8. If the total supply volume was not correct and Spring Air Systems provided the supply fan/unit then adjust the supply volume at the fan/unit or at field supplied balancing dampers. If the supply fan/unit was not provided by Spring Air Systems advise the general contractor to adjust the supply air volume and do not proceed unit the volume has been correct. The total supply volume required can be found on the Spring Air Systems shop drawings.



Measuring supply airflow through the Custom Comfort Dial:

1. Remove Blade front discharge perforated panel with appropriate tools.
2. Turn Blade's threaded rod clockwise until the blade is 1.5 inches off the vertical front surface of the hood. See diagram below.
3. Set the velometer parallel to the bottom discharge with the face open perpendicular to the perforated screen where the air discharges and take a reading every 12" apart for the full length of the hood. See diagram below.
4. Total all velocity readings and divide by the number of reading to determine the average velocity.
5. Refer to Custom Comfort Dial Velocity Chart below. Based on the hood length and the temperature rating indicated on the UL/ULC plate determine the Custom Comfort Dial Velocity.
6. If the measured average velocity is too high, turn the Blade threaded rod counter-clockwise 5 times. Re-measure average velocity. Repeat until the measured velocity at Comfort Dial is correct.
7. If the measured average velocity is too low, turn the Blade threaded rod clockwise 5 times. Re-measure average velocity. Repeat until the measured velocity of Custom Comfort Dial is correct.



FN or FB Hood Custom Comfort Dial Velocity Chart

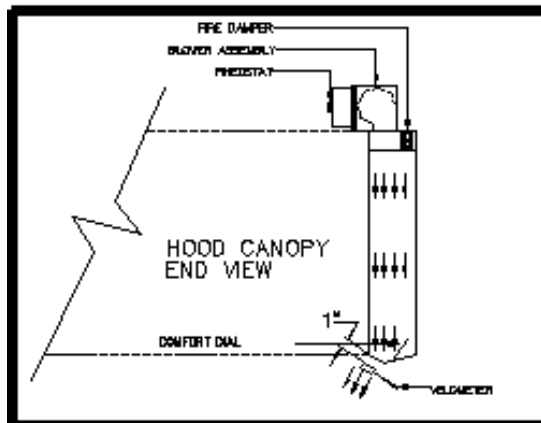
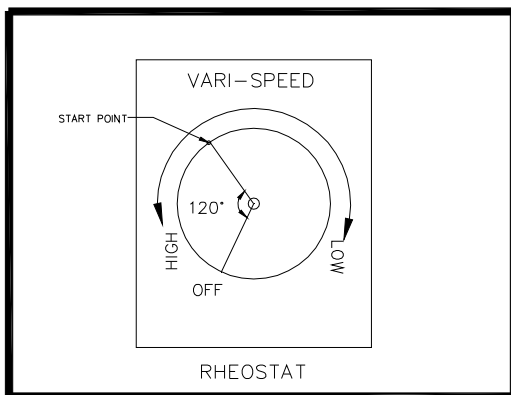
APPLIANCES	TEMP.	Hood Length (ft)	CCD VELOCITY (fpm)	
			FRONT	SIDE FLOW
			Set point	Set point
Heavy - Charbroiler	600 ⁰ F	9 - 14	500	450
Heavy - Charbroiler	600 ⁰ F	6 - 9	500	450
Heavy - Charbroiler	600 ⁰ F	4 - 6	550	450
Heavy - Charbroiler	600 ⁰ F	Up to 4	550	450
Medium – Griddle, fryer	400 ⁰ F	9 - 14	450	400
Medium – Griddle, fryer	400 ⁰ F	6 - 9	450	400
Medium – Griddle, fryer	400 ⁰ F	4 - 6	450	450
Medium – Griddle, fryer	400 ⁰ F	Up to 4	450	450

MEASURING THE SUPPLY AIRFLOW - MJ

The supply air is measured along the bottom inside discharge opening of the make up air plenum. To ensure accurate results take a reading every one foot along the length of the ventilator.

Measure supply air flow through comfort dial:

- ___ 1. Ensure the MJ blowers are powered when the exhaust fan is activated.
- ___ 2. Locate the rheostat on the back of the MJ Blower which is on top of the MJ plenum.
- ___ 3. Turn the rheostat 120 degree clock-wise to activate the MJ blower.
- ___ 4. Set the velometer parallel to the bottom discharge with the face open perpendicular to the perforated screen where the air discharges and take a reading every 12" apart for the full length of the hood. The first reading should be one inch from the end and continue every twelve inches to the opposite end of the ventilator.
- ___ 5. Total all velocity readings and divide by the number of readings to determine the average velocity.
- ___ 6. Refer to Custom Comfort Dial Velocity Chart below. Based on the hood length and the hood temperature rating indicated on the UL/ULC plate determine the Custom Comfort Dial velocity on the chart.
- ___ 7. If the measured average velocity is not correct adjust the rheostat as follows: Rotate clockwise for lower or counterclockwise for higher velocity. Retake the velocity reading to confirm the recommended set point.



**FN or FB Hood
Custom Comfort Dial Velocity Chart**

APPLIANCES	TEMP.	Hood Length (ft)	CCD VELOCITY (fpm)	
			FRONT	SIDE FLOW
			Set point	Set point
Heavy - Charbroiler	600 ⁰ F	9 - 14	500	450
Heavy - Charbroiler	600 ⁰ F	6 - 9	500	450
Heavy - Charbroiler	600 ⁰ F	4 - 6	550	450
Heavy - Charbroiler	600 ⁰ F	Up to 4	550	450
Medium - Griddle, fryer	400 ⁰ F	9 - 14	450	400
Medium - Griddle, fryer	400 ⁰ F	6 - 9	450	400
Medium - Griddle, fryer	400 ⁰ F	4 - 6	450	450
Medium - Griddle, fryer	400 ⁰ F	Up to 4	450	450



Sample RevLow Start Up Report

General Information

Job Name				
Date				
Customer				
Location				
Spring Air Service				
Exhaust Fan Model No.				
Manufacturer				
Up blast Discharge	yes		no	
Exhaust Fan HP				
Exhaust Air Design (CFM)				
Supply Air Design (CFM)				
Ventilator mounting Height from finished floor to front of hood				
Make Up Air Systems	Good	Fair	Poor	None

Hood Item			
Model		Length	
Width		No. of baffles	
Baffle Size *		Design CFM	
Baffle No. Left to Right	Baffle Setting	Velocity Reading (fpm)	Calculated Exhaust Volume per Baffle (CFM) **
1			
2			
3			
4			
5			
6			
Total Exhaust Measured CFM			
Design Exhaust CFM			

Hood Item			
Model		Length	
Width		No. of baffles	
Baffle Size *		Design CFM	
Baffle No. Left to Right	Baffle Setting	Velocity Reading (fpm)	Calculated Exhaust Volume per Baffle (CFM) **
1			
2			
3			
4			
5			
6			
Total Exhaust Measured CFM			
Design Exhaust CFM			

Hood Item			
Model		Length	
Width		No. of baffles	
Baffle Size *		Design CFM	
Baffle No. Left to Right	Baffle Setting	Velocity Reading (fpm)	Calculated Exhaust Volume per Baffle (CFM) **
1			
2			
3			
4			
5			
6			
Total Exhaust Measured CFM			
Design Exhaust CFM			

Hood Item			
Model		Length	
Width		No. of baffles	
Baffle Size *		Design CFM	
Baffle No. Left to Right	Baffle Setting	Velocity Reading (fpm)	Calculated Exhaust Volume per Baffle (CFM) **
1			
2			
3			
4			
5			
6			
Total Exhaust Measured CFM			
Design Exhaust CFM			

Hood Item			
Model		Length	
Width		No. of baffles	
Baffle Size *		Design CFM	
Baffle No. Left to Right	Baffle Setting	Velocity Reading (fpm)	Calculated Exhaust Volume per Baffle (CFM) **
1			
2			
3			
4			
5			
6			
Total Exhaust Measured CFM			
Design Exhaust CFM			

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- TruFlow Energy Management Systems
- UL/ULC Listed Pollution Control Systems
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