



DN

Dry Extractor

Maintenance Manual

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2010 Update

DN Dry Extractor Maintenance and Operating Manual

Table of Contents

Introduction	1
Spring Air Systems Hood Model Number Designations	2
Principle of Operation	2
Variflow Baffles	3
Baffle Settings	4
Extractor Insert	4
Maintenance Schedule	5
Cleaning the Exterior	5
Trouble Shooting	5
Installing the Terminator Baffle	6
Measuring the Exhaust Airflow	7
Measuring the Supply Airflow – MI Models Only	8
Measuring the Supply Airflow – MB Models Only	9
Measuring the Supply Airflow – MJ Models Only	11
DN-Startup Report	12

DN Dry Extractor Maintenance and Operating Manual

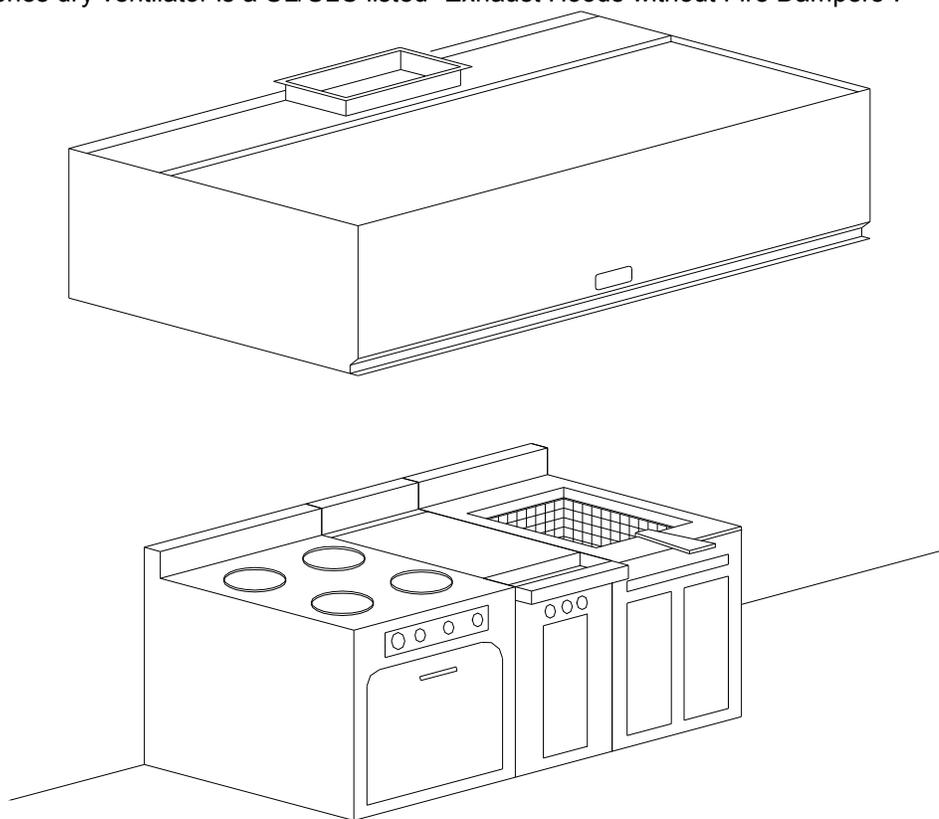
ULC/UL Listed Exhaust Hoods without Fire Dampers

INTRODUCTION

Thank you for selecting a SPRING AIR SYSTEMS INC. Commercial kitchen exhaust 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 Hoods without Fire Dampers".



Typical SPRING AIR SYSTEMS Dry Ventilator Installation

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.

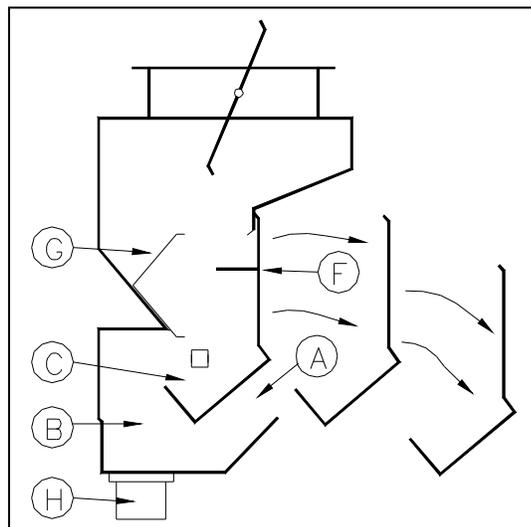
SPRING AIR SYSTEMS HOOD MODEL NUMBER DESIGNATIONS

There are numerous types and styles of SPRING AIR SYSTEM dry 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.

D	Dry Grease Extractor	D	N	B	MP	10	4
N	No exhaust fire damper						
S	Shelf type hood						
B	Box type hood						
BS	Box shelf type hood						
DB	Double box type hood						
DI	Single row Island hood						
DF	Rev-low hood						
MG	Make up air through front grilles						
MP	Make up air through perforated panels						
MI	Make up air internally						
MC	Make up air down discharge through perforated						
MR	Make up air through rear wall plenum						
MB	DynaFlow Tri-Zone control system						
MJ	DynaFlow perimeter defense system						
F	Single row canopy finished on all sides, Rev-Low type						
10	The length of the ventilator in feet						
4	The width of the ventilator in feet						

Model Number Designation - Ventilators

PRINCIPLE OF OPERATION



Type "D" Extractor

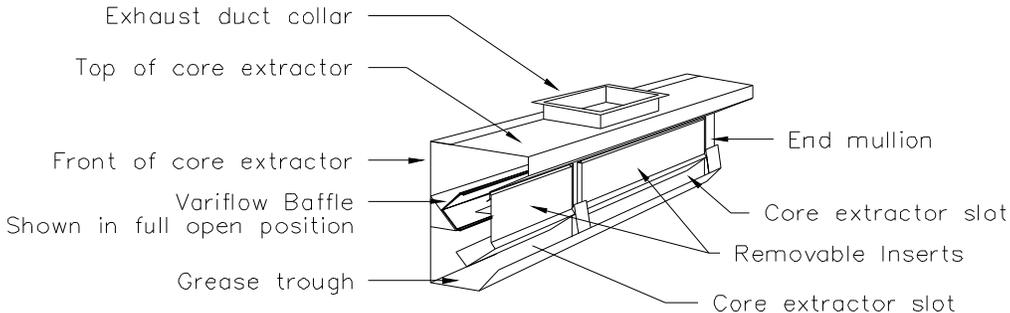
The SPRING AIR SYSTEMS type "D" extractor is a high efficiency dry extractor. The type "D" extractor removes grease, dirt and lint through centrifugal force. Remove the front access door and wipe the interior with a damp cloth to manually wash the extractor chamber.

The contaminated exhaust air enters the high velocity inlet slot A and flows through the transition zone to the VORTEX CHAMBER B. Centrifugal force causes the grease, dirt and lint particles to deposit on the PRIMARY VARIABLE FLOW BAFFLE G and VORTEX BAFFLE C. The sloping VORTEX BAFFLE C drains collected grease to the end of the ventilator into the grease cup H.

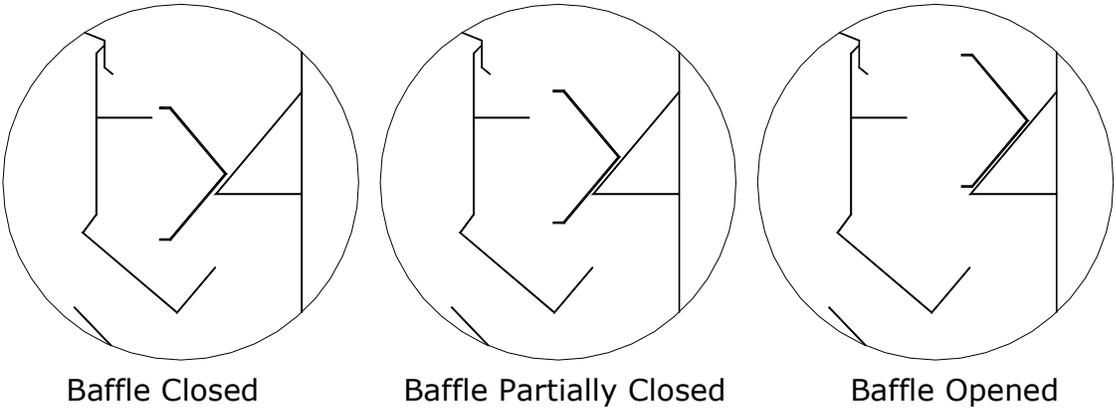
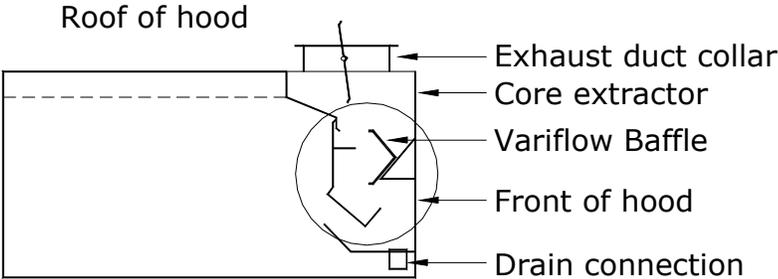
The exhaust air continues into the secondary extraction chamber, which contains an additional baffle, F. Residual grease is deposited on the secondary baffle as the exhaust air gyrates through the secondary chamber.

Variflow Baffles

The most important component for the successful operation of a DN hood is the core extractor, which contains the Variflow baffles. The core extractor profile has been designed to facilitate the smooth flow of cooking vapors and dilution air from the roof of the hood, down along the front of the core extractor and into the core extractor slot. The Variflow baffles are located inside the core extractor along the entire length. The Variflow baffles are adjustable to provide between a 90 CFM/ft to 450 CFM/ft flow rate into the core extractor slot. The Variflow baffles are adjustable without any special tools by lifting off the core extractor removable insert and hand adjusting the position of the baffle. Just set the position of the Variflow baffle to match the appliance located below. See Figure below for isometric view of Variflow baffles.



Section View of Core Extractor for DN-B Hood



Section View of DN Extractor with Detail of Vari-flow Baffle

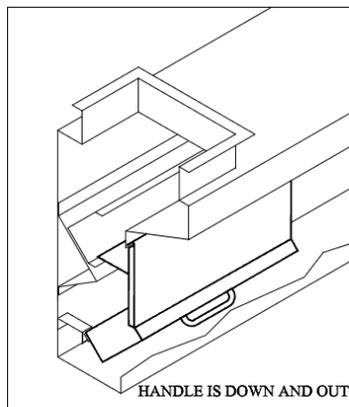
BAFFLE SETTINGS



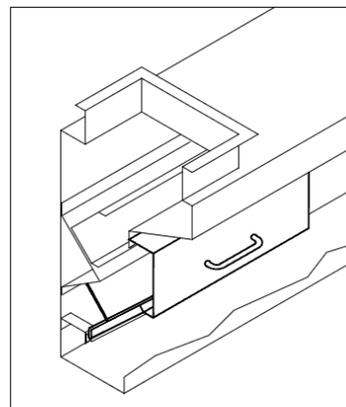
Each baffle is factory set base on the type of appliance under the hood.

Extractor Insert

REMOVEABLE INSERT INSTALLATION



CORRECT



UP SIDE DOWN

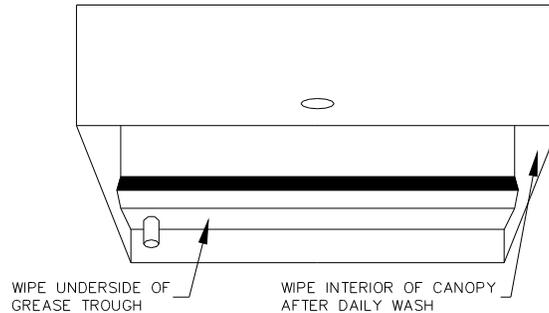
MAINTENANCE SCHEDULE

DAILY:

1. At the end of the cooking day wipe off the interior and exterior of the dry ventilator canopy and the underside of the grease trough with damp clothe.

WEEKLY:

1. Remove the grease inserts and wash in a mild detergent and water mixture.
2. Cleaning the Hood Exterior



Cleaning the Hood Exterior

Wipe off the interior of the dry ventilator plenum behind the grease extractor inserts and the interior and exterior of the grease trough. Remove the grease cup and clean if necessary.

SIX MONTHS

1. Check the exhaust fan belts for alignment, tighten, and wear. Adjust an/or replace.
2. Inspect the fusible link fire damper. Clean and/or replace the fusible link if necessary.
3. For hoods with makeup air only: remove the filter in makeup air plenum and wash in a mild detergent and water mixture.

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.**

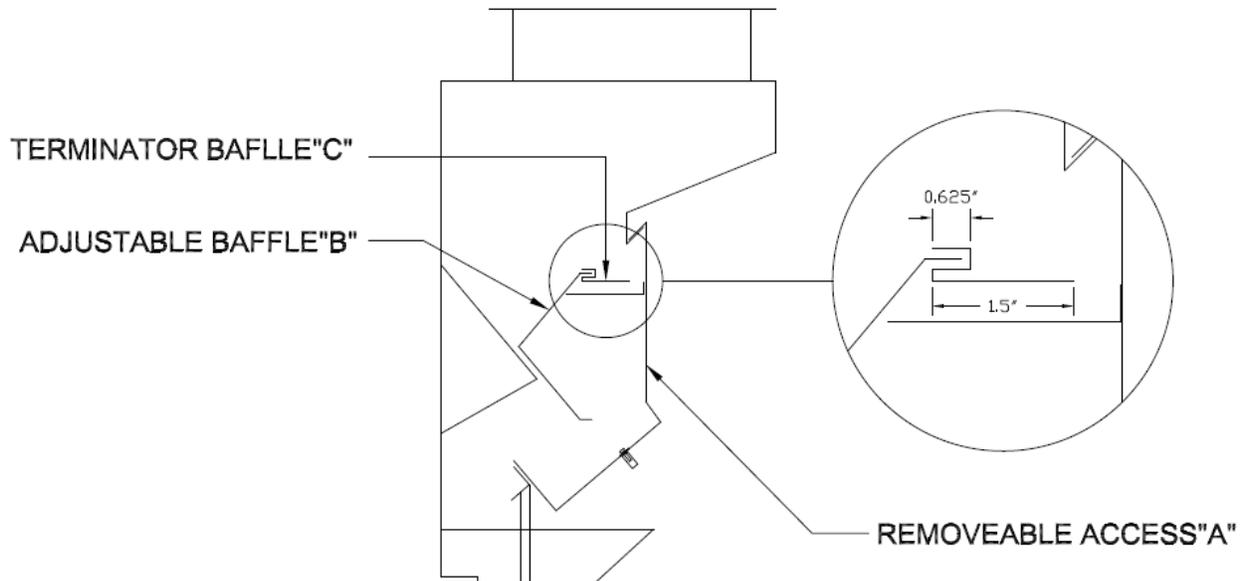
Burnt deposits, which do not respond, can usually be removed by rubbing the surface with a SCOTCH-BRITE scouring pad of STAINLESS scouring pads. **DO NOT USE ORDINARY STEEL WOOL.**

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) | Variflow 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. |
| | (v) | Check if baffle are upside down in extractor. |

INSTALLING THE TERMINATOR BAFFLE

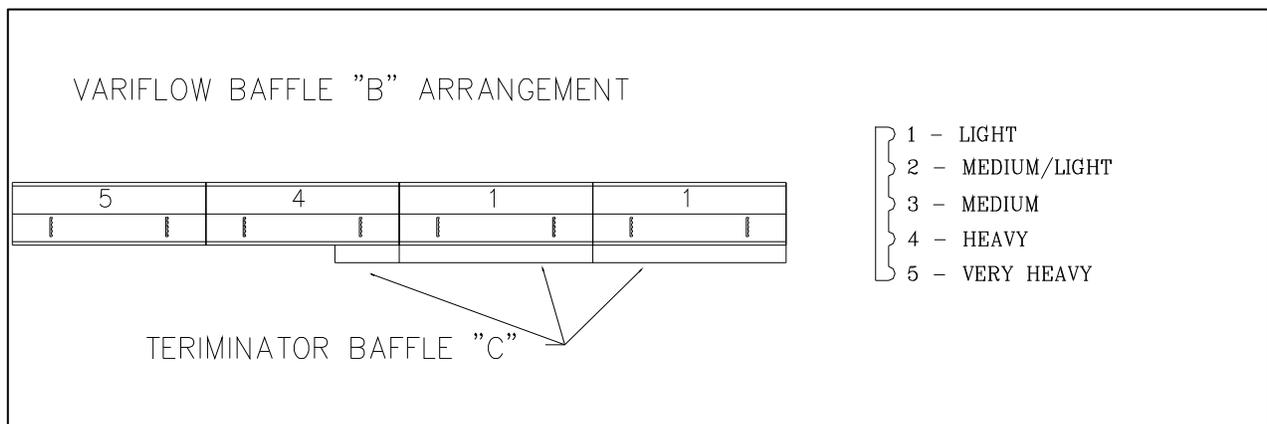


The TBDD Terminator baffle is available in various lengths to suit adverse site conditions. This will provide additional exhaust air over heavy appliances that are being effected by the surrounding environment.

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".

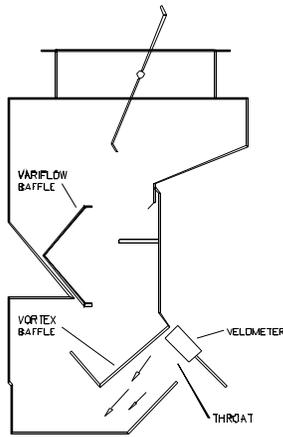
Install these baffles on the two adjustable baffles "B" located on the right or left side of the charbroiler (when looking from the front of the hood).



MEASURING THE 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.

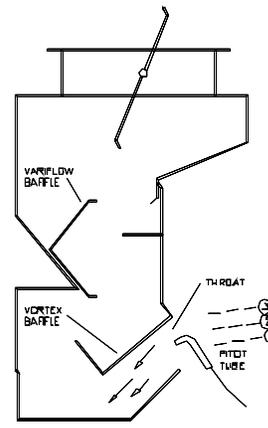
VANAXIAL VELOMETER



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.

Measuring Exhaust Air

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.

Measuring Exhaust Air

Calculating the Exhaust Air

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

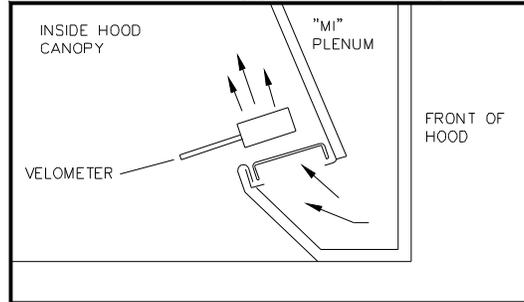
Ventilator Type	Velocity		Exhaust Air Volume	
	Fpm	m/s	CFM/ft	l/s/m
B, S, and front & back slot of DB	450	2.3	100	140
B, S, and front & back slot of DB	675	3.4	150	210
B, S, and front & back slot of DB	900	4.6	200	275
B, S, and front & back slot of DB	1125	5.7	250	340
B, S, and front & back slot of DB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

MEASURING THE SUPPLY AIRFLOW - MI MODELS ONLY

The supply air discharge from a DN-B-MI or DN-DB-MI is measured along the internal discharge perforated plate inside the filter hood canopy. To ensure accurate results take a reading every foot along the length of the filter hood.

VANAXIAL VELOMETER

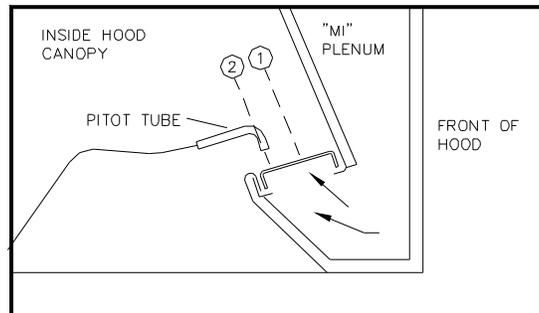
Hold the instrument parallel to and about one (1) inch from the perforated discharge slot.



*Measuring Supply Air
Figure 8*

PITOT TUBE OR ANEMOMETER

Hold the instrument parallel to and about one (1) inch from the perforated discharge slot. Take two readings across the slot and average the results.



Measuring Supply Air

Calculate the average velocity along the length of the perforated discharge and refer to chart No. 2 for corresponding CFM/ft (l/s/m). If the supply air is too high adjust the opposed blade dampers on top of the filter hood at the supply air inlets just above the supply fire dampers. Multiple dampers can be balanced to provide the velocity profile required across the supply discharge.

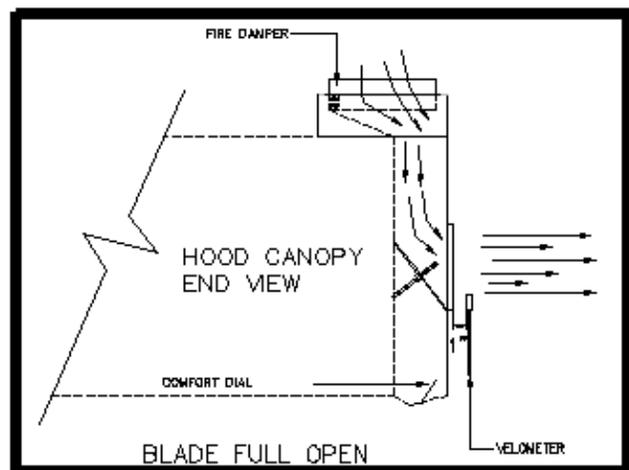
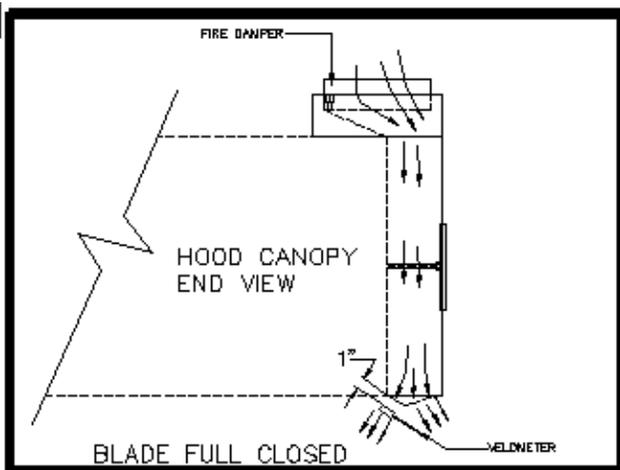
Supply Velocity vs. Supply Flow Rate

Supply Discharge Velocity		Supply Flow Rate	
fpm	m/s	CFM/ft	l/s/m
400	2.1	120	186
600	3.1	180	372
800	4.1	240	372
1000	5.1	300	466

MEASURING THE SUPPLY AIRFLOW - MB

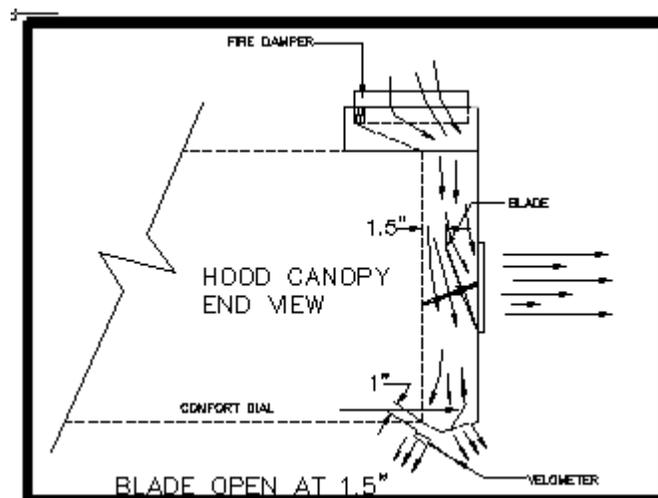
Measuring the total supply fan airflow through the Blade:

- ___ 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 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 Comfort Comfort Dial is correct.



FN or FB Hood Custom Comfort Dial Velocity Chart

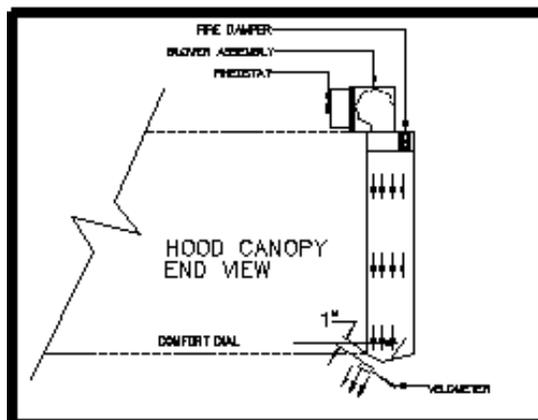
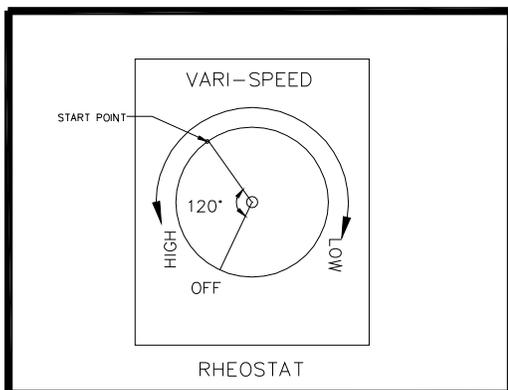
APPLIANCES	TEMP.	Hood Length (ft)	CCD VELOCITY (fpm)	
			FRONT	SIDE FLOW
			Set point	Set point
Heavy - Charbroiler	600 ⁰ F	9 - 14	500	450
Heavy - Charbroiler	600 ⁰ F	6 - 9	500	450
Heavy - Charbroiler	600 ⁰ F	4 - 6	550	450
Heavy - Charbroiler	600 ⁰ F	Up to 4	550	450
Medium - Griddle, fryer	400 ⁰ F	9 - 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 Comfort Comfort Dial Velocity Chart below. Based on the hood length and the hood temperature rating indicated on the UL/ULC plate determine the Comfort 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



DN- STARTUP 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			

Other Fine Products From



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- DynaFlow Hoods
- TruFlow Energy Management Systems
- UL/ULC Listed Pollution Control Systems
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 - Cartridge Hoods
- Filter Hoods
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