

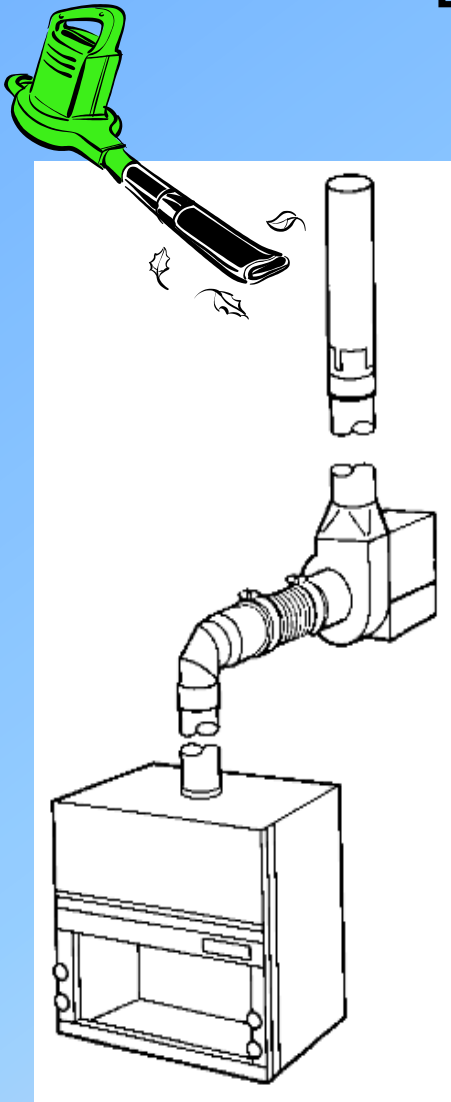
Properly Sizing a Blower



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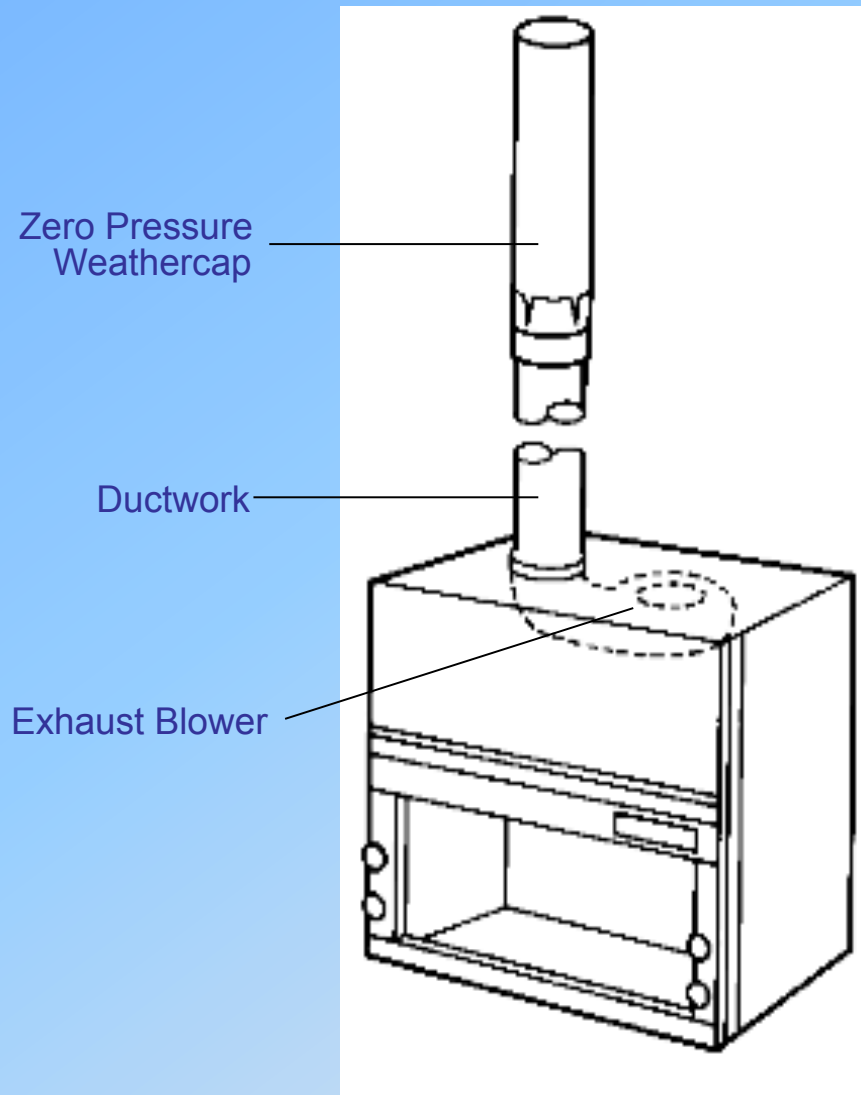
Blower Selection Process



Important Note:

- ◆ A fume hood works only as well as the blower used with it
- ◆ Blower must be properly selected for each installation
 - ✓ Chemical resistance
 - ✓ Airflow
 - ✓ Static pressure

Built-in Blower Configuration

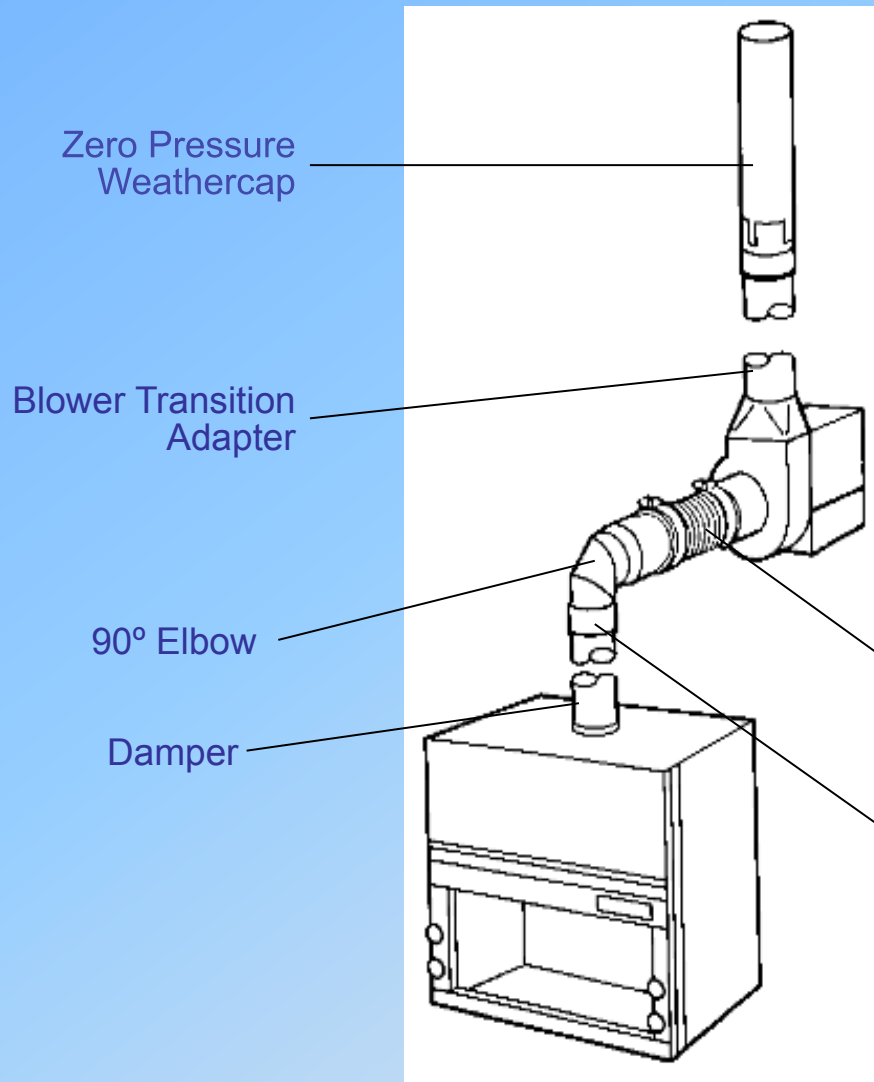


- ◆ Simple, economical installation
- ◆ Ideal for short, straight duct runs and low toxicity applications
- ◆ Generally noisier than remote installations
- ◆ Ductwork under positive pressure

Hoods with Integral Blowers:

Protector® Premier Hoods
Basic 47 and 70 Hoods
Protector® Fiberglass 30 Hoods

Remote Blower Configuration



- ◆ Most common type of installation
- ◆ Quieter than built-in blower
- ◆ Can be sized for length of duct run
- ◆ Duct under negative pressure, safest operation
- ◆ 10' Stack height, per NFPA 45
- ◆ Horizontal runs taper back to hood
- ◆ 3-5 duct diameters between elbow and blower
- ◆ Blower mounted on bushings
- ◆ Challenge blower with a damper

Flexible Duct Coupling

Ductwork

Blower Applications

Remote Blowers:

✓ Coated Steel

- For low to moderately corrosive environments
- Impeller and housing phenolic coated for corrosion resistance
- Organics, mild acids

✓ Fiberglass

- For moderately corrosive environments
- Molded polypropylene impeller resists corrosives
- Acids/corrosive applications

✓ PVC

- For highly corrosive environments
- Approved for use with perchloric acid
- PVDF impeller tolerates highly corrosive atmospheres
- Includes drain port connection for wash down system
- Acid Digestions, Perchloric, HF



Budgetary Blowers

- ◆ Refer to pages 2 and 3 of the Labconco Blower Catalog
- ◆ Locate width and type of fume hood
- ◆ Select blower based on any known information
 - ✓ Sash opening information
 - ✓ Face Velocity
 - ✓ Length of duct run
 - ✓ Blower Type

Hood	Blower Type/Equivalent Duct Run ¹								
	Sash Open	Face Velocity (fpm)	Airflow (CFM)	Duct Run Dia.(in)	Steel 25'	Fiberglass 25'	Steel 50'	Fiberglass 50'	Steel 75'
4' Protector Laboratory Hood ²	100%	100	730	12	7068800	7181000	7068800	7181000	7068800
4' Protector XStream Hood	100%	60	440	12	7068000	7180000	7068000	7180000	7068000

Once a laboratory hood has been selected, the next step is to select the proper blower and ductwork. It is important that these be listed correctly depending on hood size, application, OSHA and distance that needs to be traveled. Fume removal systems work only if the blower, ductwork, and accessories are sized properly. This brochure is designed to make choosing the correct blower and accessories easier.

Labconco blowers are designed and manufactured to give you superior performance and long life when subjected to chemical environments. They are offered in sizes that can handle airflow rates up to 200,000 CFM in blowers that can handle airflow as high as 1000 CFM. Our blowers are equipped with steel, galvanized, and PVC blowers are used for petroleum, acid and other extremely corrosive atmospheres. All blowers feature forward curved impellers to ensure quiet operation and optimum air delivery.

If you need additional assistance in the selection of blowers, ductwork and accessories, contact Labconco at 800-825-8818 or 810-353-8811.

Coated Steel and Fiberglass Blower Selection Guide

Blower	Sash Open	Face Velocity (fpm)	Airflow (CFM)	Duct Run Dia.(in)	Blower Type/Equivalent Duct Run ¹									
					Steel 25'	Fiberglass 25'	Steel 50'	Fiberglass 50'	Steel 75'	Fiberglass 75'	Steel 100'	Fiberglass 100'	Steel 150'	Fiberglass 150'
4' Protector Laboratory Hood ²	100%	100	730	12	7068800	7181000	7068800	7181000	7068800	7181000	7068800	7181000	7068800	7181000
4' Protector XStream Hood	100%	60	440	12	7068000	7180000	7068000	7180000	7068000	7180000	7068000	7180000	7068000	7180000

Notes: Blower performance and ductwork are based on a 100 ft. duct run. ¹Equivalent duct run is based on a 100 ft. duct run. ²Blower performance is based on a 100 ft. duct run.

The Blower Selection Guide, shown on pages 2 and 3, is a helpful and accurate method for selecting the correct blower and ductwork for your laboratory application. Fume removal systems work only if the blower, ductwork, and accessories are sized properly. This brochure is designed to make choosing the correct blower and accessories easier.

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Coated Steel and Fiberglass Blower Selection Guide (cont.)

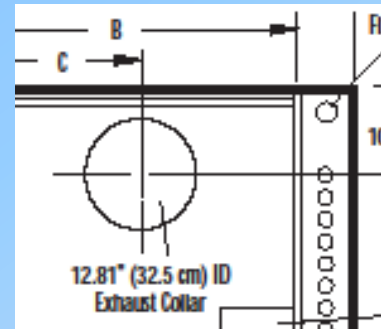
Blower	Sash Open	Face Velocity (fpm)	Airflow (CFM)	Duct Run Dia.(in)	Blower Type/Equivalent Duct Run ¹									
					Steel 25'	Fiberglass 25'	Steel 50'	Fiberglass 50'	Steel 75'	Fiberglass 75'	Steel 100'	Fiberglass 100'	Steel 150'	Fiberglass 150'
4' Protector Laboratory Hood ²	100%	100	730	12	7068800	7181000	7068800	7181000	7068800	7181000	7068800	7181000	7068800	7181000
4' Protector XStream Hood	100%	60	440	12	7068000	7180000	7068000	7180000	7068000	7180000	7068000	7180000	7068000	7180000

Notes: Blower performance and ductwork are based on a 100 ft. duct run. ¹Equivalent duct run is based on a 100 ft. duct run. ²Blower performance is based on a 100 ft. duct run.



Damper Selection

- ◆ Determine nominal fume hood duct collar diameter, from Labconco fume hood catalog Dimension Data



- ◆ Locate correlating damper part number from page 14 of the Labconco Blower Catalog

Nominal Diameter/Inches	6	8	10	12	16
Catalog Number	4724200	4741300	5983400	5981200	4726400
Shipping Weight lbs./kg	10/5	12/5	15/7	20/9	25/11
Approx. Height/inches	14	19.125	19.5	19.67	24

- ◆ A damper should always be included when selecting a blower.

Ductwork and Accessories

Manual Duct Dampers
This damper fitting allows you to balance airflow. It may be used with exhaust and auxiliary air ducts, and is usually placed directly above the fume hood.

Nominal Diameter/Inches	6	8	10	12	16
Catalog Number	4724200	4741300	5983400	5981200	4726400
Shipping Weight lbs./kg	10/5	12/5	15/7	20/9	25/11
Approx. Height/Inches	14	19.125	19.5	19.67	24

Flexible Duct Connections
This flexible connection reduces vibration between the blower and PVC ductwork. It is supplied with two clamps for easy installation.

Nominal Diameter/Inches	8" for use with 8" fittings	11" for use with 10" fittings	12" for use with 12" fittings
Catalog Number	4750200	7004200	5021400
Shipping Weight lbs./kg	5/2	6/2	5/2

Blower Transition Adapters
This epoxy-coated steel transition adapter fits all Labconco Coated Steel Blowers. This adapter allows you to connect round thermoplastic duct to the exhaust side of the blower to create an exhaust stack. Nominal size PVC duct fits inside the adapter opening.

Nominal Diameter/Inches	8	10	12
Catalog Number	4752400	4722400	7021400
Shipping Weight lbs./kg	11	12	12
Fit use with Labconco Blowers	100000, 102000	100000, 102000	100000, 102000

Auxiliary Air Transition Adapter
The Auxiliary Air Transition Adapter is the same construction as the Blower Transition Adapter but is designed to allow you to connect round thermoplastic duct to the rectangular auxiliary air collar of Protector Fume Hoods.

Nominal Diameter/Inches	10
Catalog Number	4801000
Shipping Weight lbs./kg	4/2

T and Y Connections
PVC fittings shaped in T and Y configurations. Compatible with thermoplastic duct. Dual connections receive PVC pipe directly. Contact Labconco for help in sizing blowers with these accessories.

Nominal Diameter/Inches	10 x 10 x 12	12 x 10 x 12
Catalog Number	5020400	5020400
Shipping Weight lbs./kg	10/5	10/5
Approx. Height/Inches	19	19

Nominal Diameter/Inches	10 x 10 x 12	12 x 10 x 12
Catalog Number	5020400	5020400
Shipping Weight lbs./kg	10/5	10/5
Approx. Height/Inches	12.75	21.75

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Blower Sizing...

1. Finding Fume hood data/ design requirements
2. Detail the Duct Run
3. Defining the “System”
4. Determine equivalent duct run length
5. Find SP loss through duct
6. Determine Total SP loss
7. Correction Factors
8. Select blower

...one step at a time

Fume Hood Data

- ◆ Determine the fume hood model number
 - ✓ Go to the corresponding Labconco fume hood catalog pages
- ◆ Find the exhaust tables
- ◆ Determine total CFM and Static Pressure (SP) through the hood based on:
 - ✓ Desired sash position
 - ✓ Desired face velocity
 - ✓ Nominal hood width

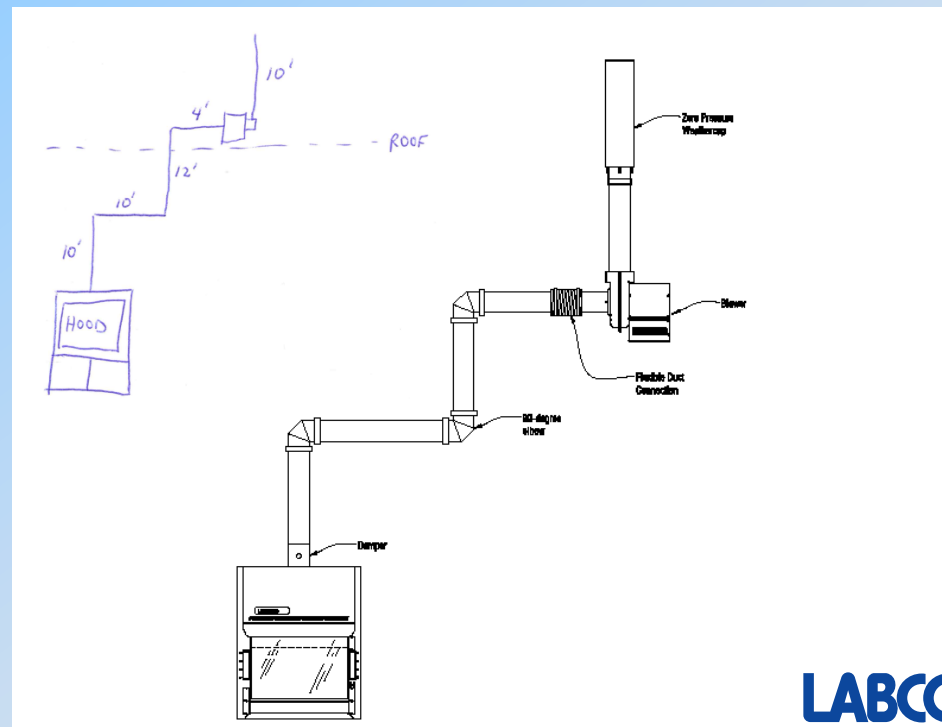
With Sash Full Open (28")					
Nominal Width	Total Exhaust CFM and Static Pressure				
	100 fpm	S.P.	80 fpm	S.P.	
4 Foot	730	0.17"	590	0.11"	
5 Foot	960	0.24"	770	0.16"	
6 Foot	1180	0.31"	940	0.20"	
8 Foot	1660	0.22"	1330	0.15"	

With Sash 60% Open (18")**						
Nominal Width	Total Exhaust CFM and Static Pressure					
	100 fpm	S.P.	80 fpm	S.P.	60 fpm	S.P.
4 Foot	470	0.07"	380	0.05"	280	0.03"
5 Foot	610	0.11"	490	0.08"	370	0.04"
6 Foot	750	0.14"	600	0.09"	450	0.05"
8 Foot	1060	0.08"	850	0.06"	640	0.03"

Detail the Duct Run

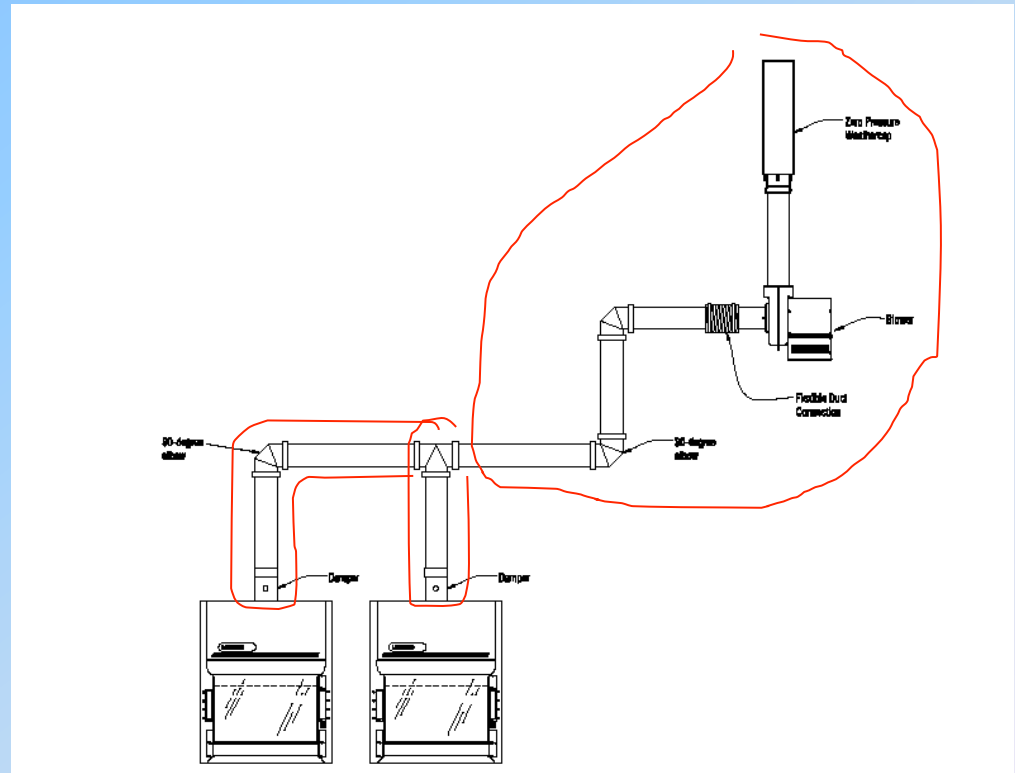
- ◆ Consider These Questions
 - ✓ How many hoods?
 - ✓ How many elbows (90, 45 degree, etc)?
 - ✓ How many feet of straight duct?
 - ✓ How tall will the stack be?
 - ✓ What is the duct diameter?

- ◆ Draw a picture!!




Define the System

- ◆ What is a “System”?
 - A continuous section of ducting where the air has the same volumetric rate and velocity
- ◆ Three System Example:
 - ◆ System #1 (leg)
 - ◆ System #2 (leg)
 - ◆ System #3 (main body)
- ◆ Each System must be addressed separately.



Calculating Duct Run Equivalent Length

- Add up all the straight section lengths
- Add equivalent lengths for elbows
 - ✓ See page 13 of Labconco Blower Catalog for equivalencies



Nominal Diameter/Inches	6	8	10	12	16
Catalog Number	4708700	4719000	7027300	5602100	5605100
Approx. Height/Inches	13.625	17.313	20.375	24.188	29.000
Shipping Weight lbs./kg	8/4	10/5	12/5	14/6	17/8
Equivalent Resistance in feet of Straight Duct	12	15	20	25	36

Ductwork and Accessories

Elbows
PVC elbows, both 90° and 45°, are compatible with thermoplastic duct. Designed and engineered to resist turbulence and maintain pressure losses, they feature ball-and-socket connections to ensure PVC duct integrity.

Thermoplastic Duct Reducers
PVC coupling (tee) reducers are designed for connecting thermoplastic duct of different diameters. Coupler joint allows extra air with your duct size to save 8¢ per ft. in energy.

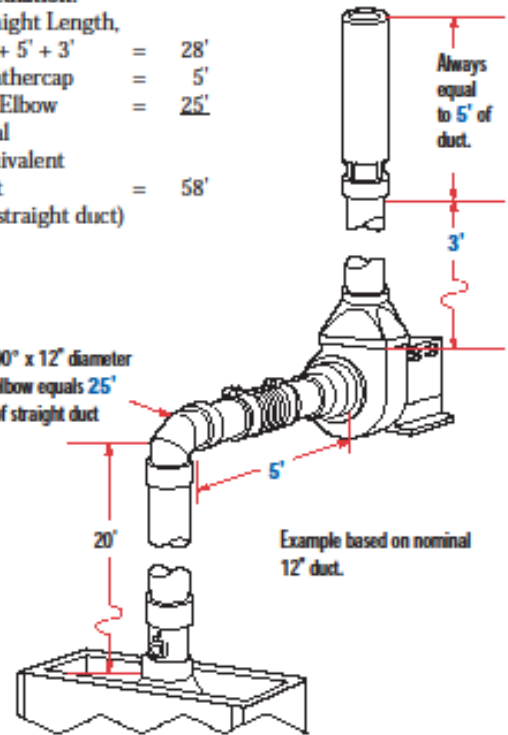
Zero Pressure Weathercaps
The Zero Pressure Weathercap is made of strong, corrosion-resistant PVC. The cap will hold tight against the duct's exterior and allows for vertical discharge of the effluent as far as 100 feet away from the building.

Spiral Tube
This spiral tube augments respiratory installations. It is corrosion resistant, requires no support, flexes and folds with most fans, includes 1/4" hole connector and two clamp length 1/2" in line.



Typical Ductwork Installation Example

Calculation:
 Straight Length,
 $20' + 5' + 3'$ = 28'
 Weathercap = 5'
 90° Elbow = 25'
 Total Equivalent Feet = 58'
 (in straight duct)



Elbow Equivalent Resistance Chart (In Feet Of Straight Duct)

	6" Duct	8" Duct	10" Duct	12" Duct
90° Elbow	12'	15'	20'	25'
45° Elbow	6'	7.5'	10'	12.5'

Determining Static Pressure (SP)

- Collect your information from previous steps
 - Diameter of duct (inches)
 - Volumetric rate of air (CFM)
 - SP through the hood
 - Duct run equivalent Length (ft)
 - For each system if applicable
- Go to table on back cover of Blower Catalog
- Locate Static Pressure/10ft from table based on
 - duct diameter/inches
 - Airflow/CFM
- Calculate Static Pressure through ducting
 - $(\text{Number from table}) / (10) \times (\text{Equivalent Length})$
- Calculate total Static Pressure
 - Static Pressure through duct + Static Pressure through hood
 - If your duct run had multiple “systems”, the “main body system” Static Pressure is added to the Static Pressure from the “leg system” with the highest static pressure.

Nominal Diameter/Inches	6	8	10	12	16
Actual OD/inches	6.625	8.625	10.750	12.750	16.000
Actual ID/inches	6.250	8.250	10.375	12.375	15.625
Catalog Number	4708600	4718900	7027200	5602000	5605000
Shipping Weight lbs./kg	25/11	35/16	50/23	65/29	80/36
Airflow/CFM	Static Pressure Loss/Inches H ₂ O for Each 10 ft. of Duct Length				
250	.039	.011	.003	.001	—
500	.147	.037	.013	.005	.001
750	.321	.079	.026	.011	.003
1000	.557	.140	.043	.018	.005
1250	.855	.210	.066	.027	.008
1500	—	.300	.095	.039	.012
1750	—	.380	.130	.053	.016
2000	—	.485	.155	.067	.020
2500	—	—	.245	.109	.031
3000	—	—	—	.145	.042
4000	—	—	—	.240	.074
5000	—	—	—	—	.120

Correction Factors

- There is no correction for CFM, we only adjust Static Pressure
- Calculate Correction Factor
 - Multiply Temperature Factor by Altitude Factor
- Calculate Static Pressure
 - Multiply total SP (from previous slide) by Correction Factor

Air Density Correction Factors			
Correction Factors for Temperature		Correction Factors for Altitude	
Temp, °F	Factor	Feet, ASL	Factor
0	0.87	0	1.00
40	0.94	500	1.02
70	1.00	1000	1.04
100	1.06	1500	1.06
140	1.03	2000	1.08
180	1.21	3000	1.12
200	1.25	4000	1.16
250	1.34	5000	1.20
300	1.43	6000	1.25
350	1.53	7000	1.30

Blower Selection

- Collect the following information
 - Volumetric Rate (CFM)
 - Static Pressure (Corrected)
 - Blower Type (Coated Steel, Fiberglass, PVC)
- Select Blower from Blower Catalog
 - ✓ Locate type of blower type in catalog
 - ✓ Find Total Static Pressure at the top of the page
 - ✓ Move down the column to the correct CFM range
 - ✓ Blower model number is at the left

	Catalog Numbers		Motor Data		CFM & RPM Ranges					
	Std.	E.P.	HP	Electrical Requirements	F.L. Amps	.12 CFM/RPM	.25 CFM/RPM	.38 CFM/RPM	.50 CFM/RPM	.62 CFM/RPM
10" Inlet	7180000		1/6	115V/60 Hz/1Ø	4.0	325 @ 630	250 @ 750	305 @ 920		
	7180100		1/6		3.15	500 @ 840	520 @ 962	400 @ 962		
	7180200		1/4	115V/60 Hz/1Ø	4.4		520 @ 962	400 @ 962	350 @ 1050	
	7180300		1/4		4.5		700 @ 1173	640 @ 1173	560 @ 1173	
	7180400		1/3	115V/60 Hz/1Ø	6.1			640 @ 1173	560 @ 1173	390 @ 1150
	7180500		1/3		6.4			840 @ 1400	820 @ 1450	780 @ 1456
7180600		1/2	115V/60 Hz/1Ø	8.4			840 @ 1400	820 @ 1450	780 @ 1456	

- Remember, a damper is needed to properly “challenge” the blower

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