



Blower Selection

Sizing the right blower requires knowing how much air movement is required plus the amount of static pressure.

Static Pressure is the pressure in the system which is lost to friction. Ductwork, dampers, hoses and blowers all provide resistance to the air passing through them. In an air system, the common unit of pressure is the height of a water column in inches per 100 feet (wg).

Room ventilators which have no ductwork will only have the efficiency loss created by the fan and belts. There is no static pressure loss as there is no interference with the air. Ducted systems must account for static pressure loss.

Total Static Pressure is determined by adding the static pressures of any of the air handling components in a system capable of offering resistance to the flow of air. A 10 percent allowance to the sum of these static pressures is added to determine the total static pressure. Ductwork Static Pressure is calculated based on the length of the longest run of duct, the number and size of elbows, and the diameter and velocity of the largest duct and the hoses. SVI has developed handy charts to make this whole process simple. Most of the pressure loss due to friction occurs in the hoses.

Your SVI sales people can determine all these factors for you. Just give them a call.

Five Steps to Determine Static Pressure

Step 1. Determine the total amount of C.F.M. required by the system.

This is done by multiplying the CFM per stall requirement times the total number of stalls or exhaust hose drops. Use the following as a guideline.

Vehicle	CFM per inlet
Passenger Cars:	200 CFM
Light Trucks:	250 CFM
Medium Trucks:	300 CFM
Diesel Trucks	400 CFM
Buses	400 CFM
Heavy Diesel Engines	600 CFM

If passenger cars and light trucks will be the primary vehicles, use 235 CFM.

Step 2. Determine the total length and the pressure loss due to friction in the ductwork (in ft.).

Include any vertical rises, but not the hoses. Hoses will be figured later. Determine the friction loss using Chart B on the Blower Selection Checklist. The left column is shown in multiples of 100 feet. (example: 120 feet of duct pulling 2500 CFM will be $0.38 \times 1.2 = .46$ " w.g.)

Step 3. Add the Elbows to the System.

Multiply the number of 90° bends in the system by .06" wg. This approximation is not exact but provides a friction loss within acceptable error levels.

Step 4. Add the friction pressure loss from the exhaust hose to the calculation.

Use Chart A on Blower Selection Checklist to determine how much friction loss (static pressure) to add to the total.

Step 5. Take the total static pressure component for determining the size of the blower.

A 10% error factor is generally added to the calculation.

Example: The Right Fan for the Job

Example: An "L" shaped exhaust system with 12 bays is proposed. The service bays will be repairing diesel trucks. The overall length of the shop is 90 feet long by 75 feet wide.

Step 1. The overall CFM requirement will be 400 CFM per outlet x 12 bays = 4800 CFM. The system will require 20" diameter ductwork. (See page 13 for ductwork diameter).

Step 2. The ductwork will run 75 ft. + 90 ft + an extra 4 ft. vertical = 169 ft. The friction loss at 2000 FPM will be based on 169 ft. $4800 \text{ CFM} = .23$ " per 100 ft. friction loss x 1.69 = 0.39" of overall friction loss in the ductwork.

Step 3. There will be one elbow at the base of the L plus a goose neck (twin elbows) leading to the blower (mounted on the roof). $3 \times .06$ " = .18" for the elbows.

Step 4. The exhaust hose will add $.110" \times 22' = 2.42$ " (using 22' of 5" exhaust hose per drop) for a total static pressure loss of 2.99".

Step 5. The 10% allowance brings the total to 3.29" S.P. By requesting an **ES-1214-4800** you will receive the correct belt drive blower for this application.

Please see pages 14-15 for a handy worksheet for putting together your entire system.



Blower Selection Checklist

- 1) 1a)* Type of System: ☐ Overhead ☐ Underfloor
- 1b)* Choose one: ☐ Single Phase ☐ Three Phase
- 1c)* Choose one: ☐ Direct Drive ☐ Belt Driven
- 1d)* To be mounted: ☐ Inside ☐ Outside

2)* How Many Stalls

3)* What Type of Vehicles (see Chart A)
CFM per stall

4) Total CFM Requirement (Multiply line 2 by line 3)

5)* Determine Hose Size inches (See Chart A)

6) Determine Static Pressure

6a)* What is total length of ductwork (in feet)

6b) Divide line 6a by 100

6c) Static Pressure in Ductwork per 100 ft.
(see Chart B)

6d) Total Static Pressure (multiply 6b x 6c)

6e) Static Pressure in Exhaust Hose
(see Chart C)

6f)* Number of feet of exhaust hose per drop

6g) Multiply 6e x 6f

6h)* Total Number of Elbows or Bends in Ductwork

6i) Multiply 6h x .06"

6j) Sub Total Static Pressure: (6d + 6g + 6i)

6k) TOTAL STATIC PRESSURE (6j + 10%)
(Round up to nearest inch - i.e. 2.3 = 3")

Use line 4 and 6k to select Blower:

SVI Part Number

Chart A

Vehicles	use CFM	Hose Dia.
Cars/Light Trucks	235	3" to 4"
Medium Trucks	300	4"
Diesel Trucks/Buses	400	5"
Heavy Diesel Engines	600	6"

Chart B

DUCTWORK STATIC PRESSURE

Total CFM	SP per 100 ft.
500	1.50 inches
800	1.39 inches
1000	1.24 inches
1200	1.00 inches
1500	0.90 inches
1800	0.80 inches
2000	0.70 inches
2500	0.64 inches
3000	0.58 inches
3500	0.57 inches
4000	0.46 inches
4500	0.42 inches
5000	0.41 inches
6000	0.38 inches

Chart C

EXHAUST HOSE STATIC PRESSURE

Exhaust Hose ID	CFM	Static Press. per foot
3"	200	.335"
3"	235	.408"
4"	235	.104"
4"	300	.171"
4"	400	.305"
5"	400	.110"
5"	600	.244"
6"	400	.054"
6"	600	.103"

* **Required Fields.** Provide the required information, and any other known information; SVI will help determine the best blower for your application.

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