

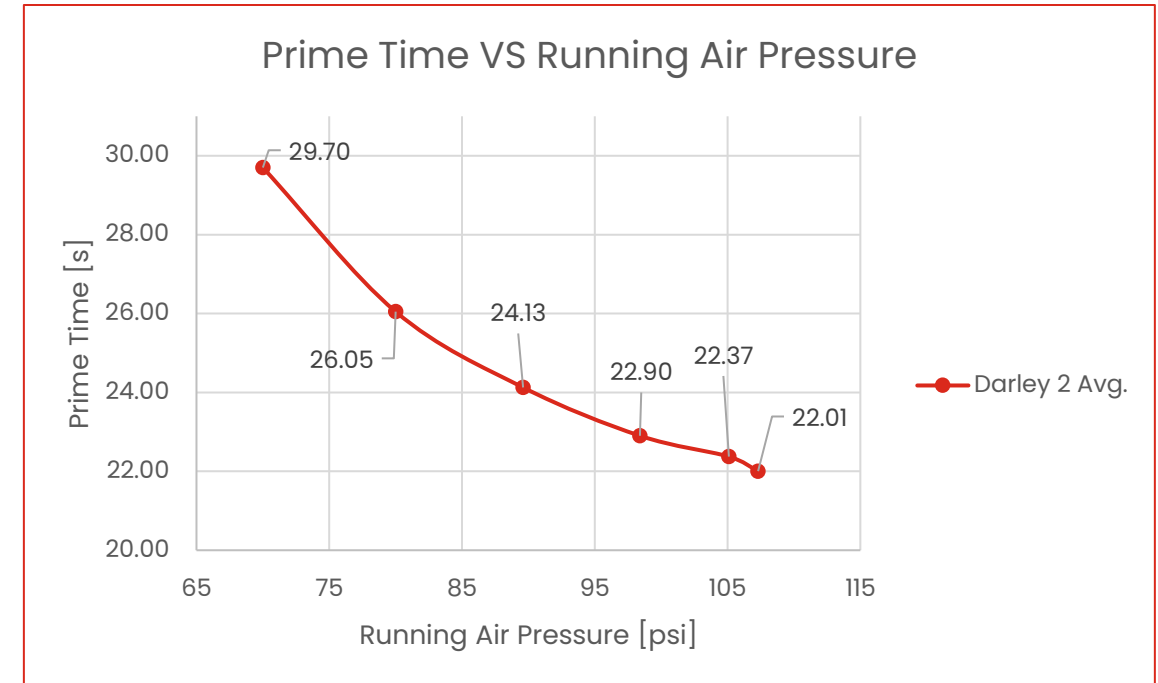
Set Pressure VS Running Pressure

- In the following slides and graphs I use the terms “set pressure” and “running pressure” and I define them as the following:
- Set Pressure – The compressed air pressure I measured while the solenoid valve is closed and air is not running through the primer
- Running Pressure – The compressed air pressure I measured while the solenoid valve is open and air is running through the primer
- The running pressure is always less than the set pressure because of a pressure drop due to the air hose inner diameter (more friction loss) and the affects can be see in the “Pressure Drop VS Air Lines” slide



(1) 6" Suction Test at 10'

- The Darley Air Primer met the NFPA requirement of 30 seconds at all possible running air pressures
- Darley's fastest average prime time – 22.01 s @ 107 psi running pressure

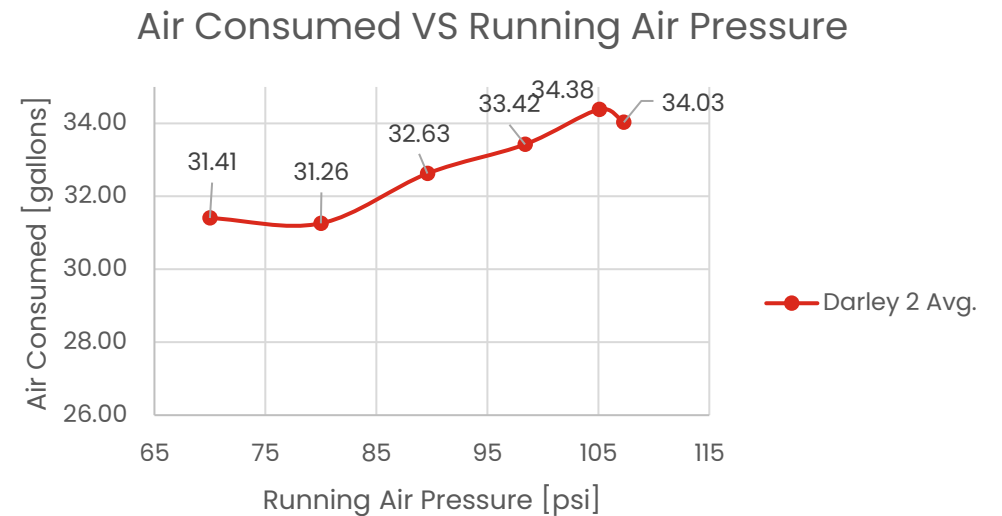
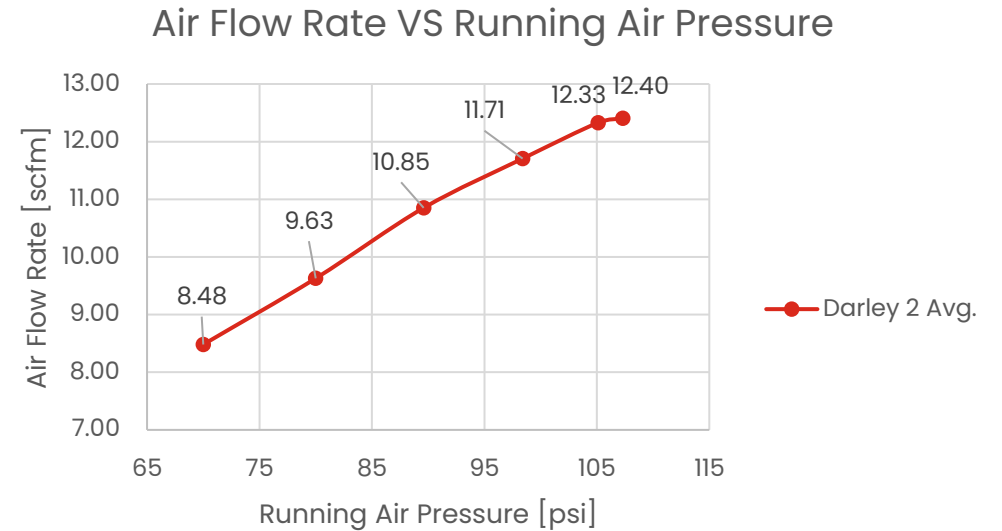


In this test, per NFPA 16.2.3.3.1, a pump that is less than 1500 gpm shall be capable of priming in 30 seconds or less. To confirm that a primer can reach this requirement for all ratings from 250 – 1250 gpm, a primer must be able to do this through 2x 10-foot sections of 6" hose (see NFPA Table 16.2.4.1(a) for reference).



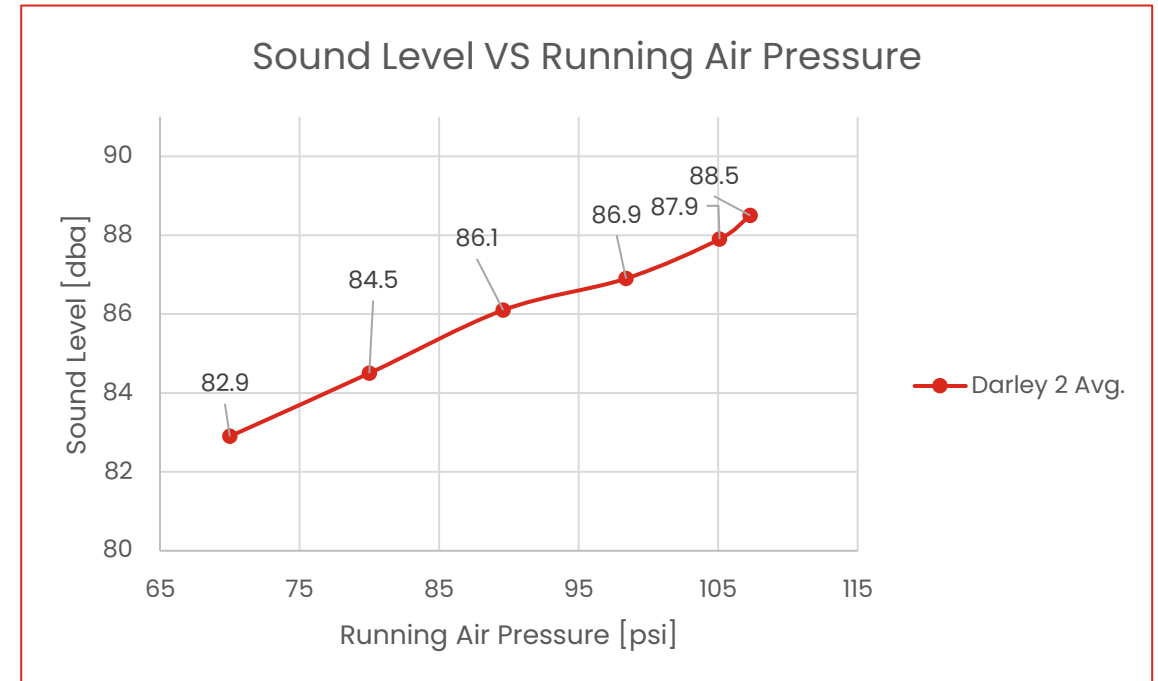
(1) 6" Suction Test at 10'

- The air flow rate and total air consumption is shown on the right
- The Darley Air Primer had a highest average flow rate of 12.40 SCFM @ 125 PSI set pressure
 - This means an air compressor capable of outputting more than 12.40 SCFM can be used to supply this air primer system for (1) 6" suction applications
- The total air consumption is based on the flowrate and prime time shown in gallons and is graphed on the right



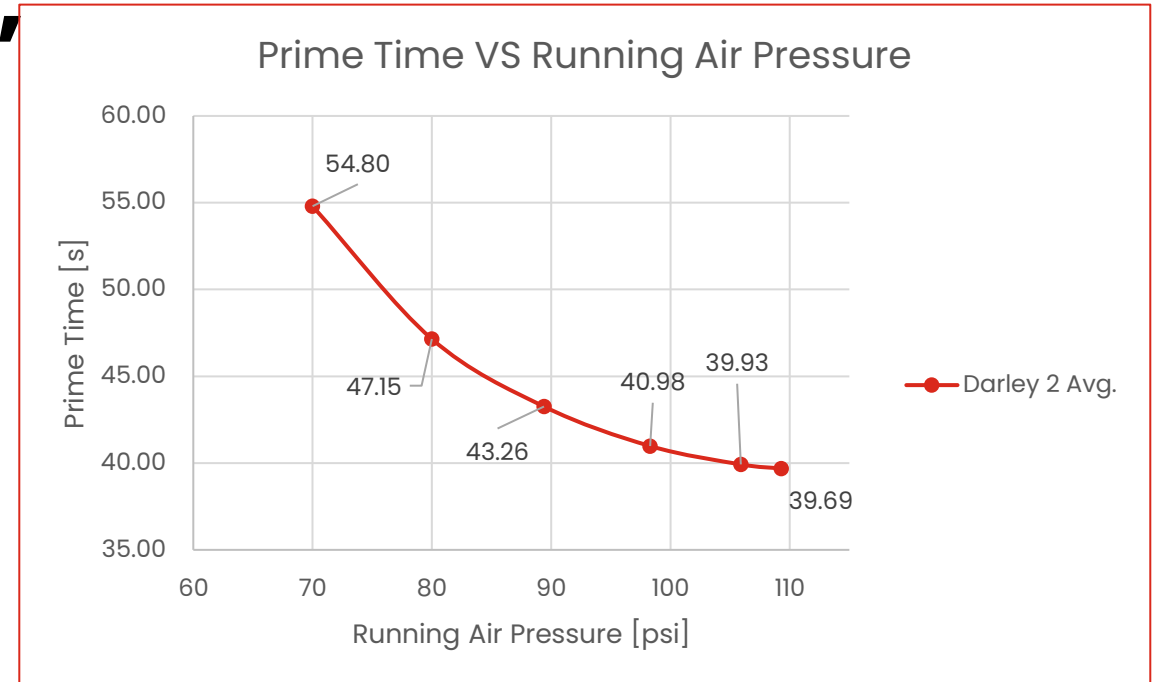
(1) 6" Suction Test at 10'

- The sound level for the (1) 6" Suction test was at an acceptable level
- Max Avg. Darley dba = 88.5



(2) 6" Suction Test at 10'

- The Darley Air Primer met the NFPA requirements of priming in 45 seconds or less at running air pressures of 85 psi and higher
- Darley fastest average prime time – 39.69 s @ 109 psi running pressure



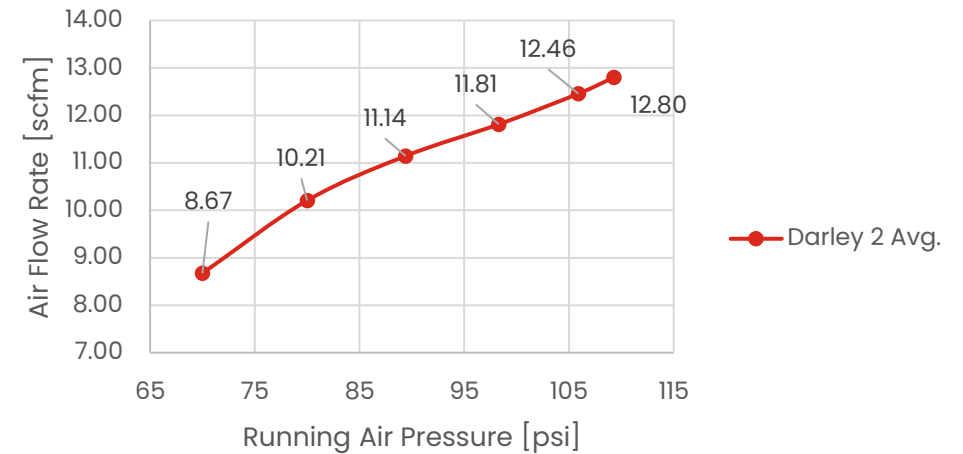
In the test, per NFPA 16.2.3.3.2, a pump that is 1500 or greater gpm shall be capable of priming in 45 seconds or less. A 1500 gpm rated pump requires 2x 6" suction hoses (each suction consisting of 2x 10-foot sections of 6" hose) at a 10-foot lift, while a 1750 gpm rating requires an 8-foot lift, and a 2000 gpm rating requires a 6-foot lift (see Reference (1): NFPA Table 16.2.4.1(a)). Because of the lowering lift requirements, a primer that can prime 2x 6" suction hoses each of 2x 10-foot segments at a 10-foot lift can also prime the 1750 and 2000 gpm ratings at an 8-foot and 6-foot lift, respectively.



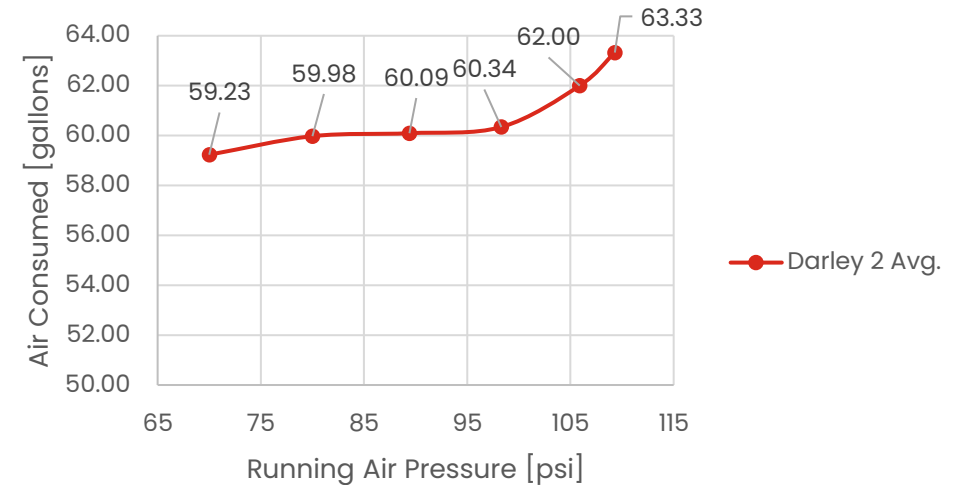
(2) 6" Suction Test at 10'

- The air flow rate and total air consumption is shown on the right
- The Darley Air Primer had a highest average flow rate of 12.80 SCFM @ 125 PSI set pressure
 - This means an air compressor capable of outputting more than 12.80 SCFM can be used to supply this air primer system for (2) 6" suction applications
- The total air consumption is based on the flowrate and prime time shown in gallons and is graphed on the right

Air Flow Rate VS Running Air Pressure

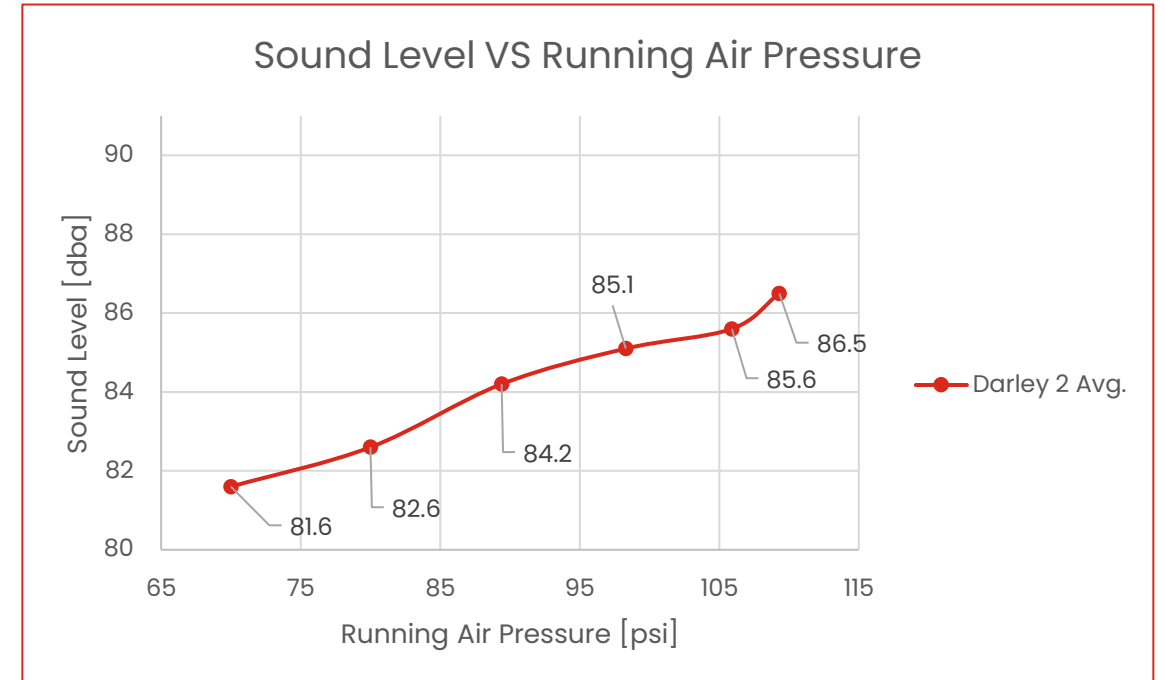


Air Consumed VS Running Air Pressure



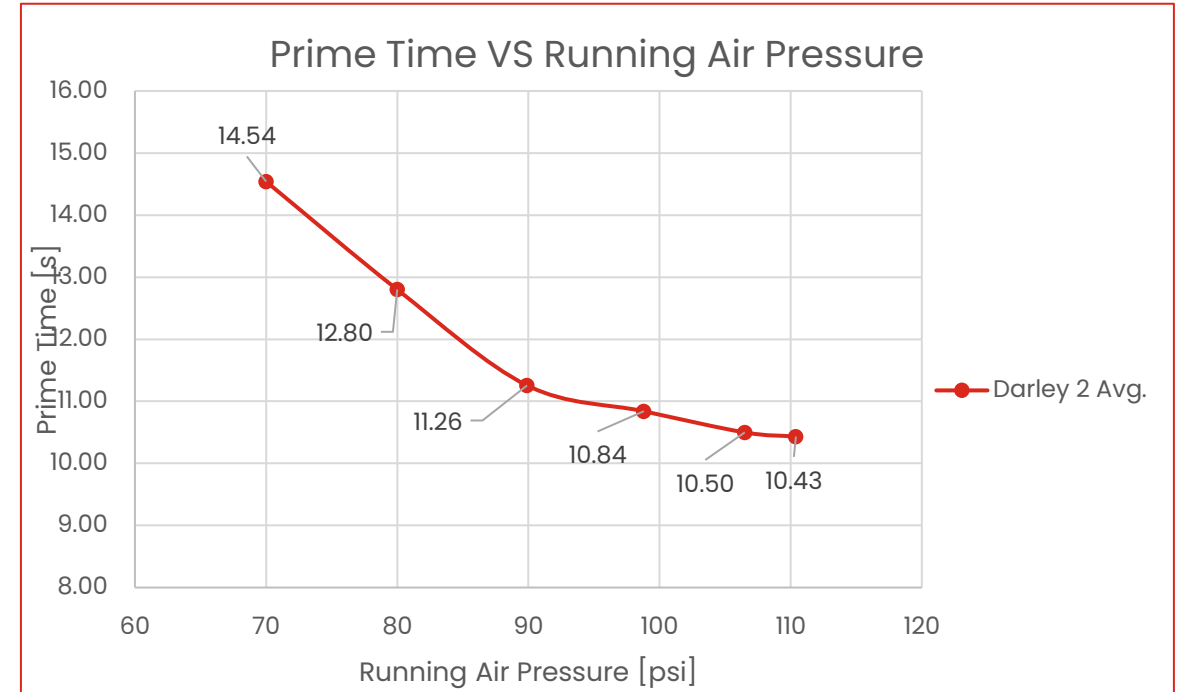
(2) 6" Suction Test at 10'

- The sound level for the (2) 6" Suction test was at an acceptable level
- Max Avg. Darley dba = 86.5



(1) 4" Suction Test at 10'

- The Darley Air Primer met the NFPA ratings at all running air pressures
- Darley fastest average prime time – 10.56 s @ 107 psi running pressure

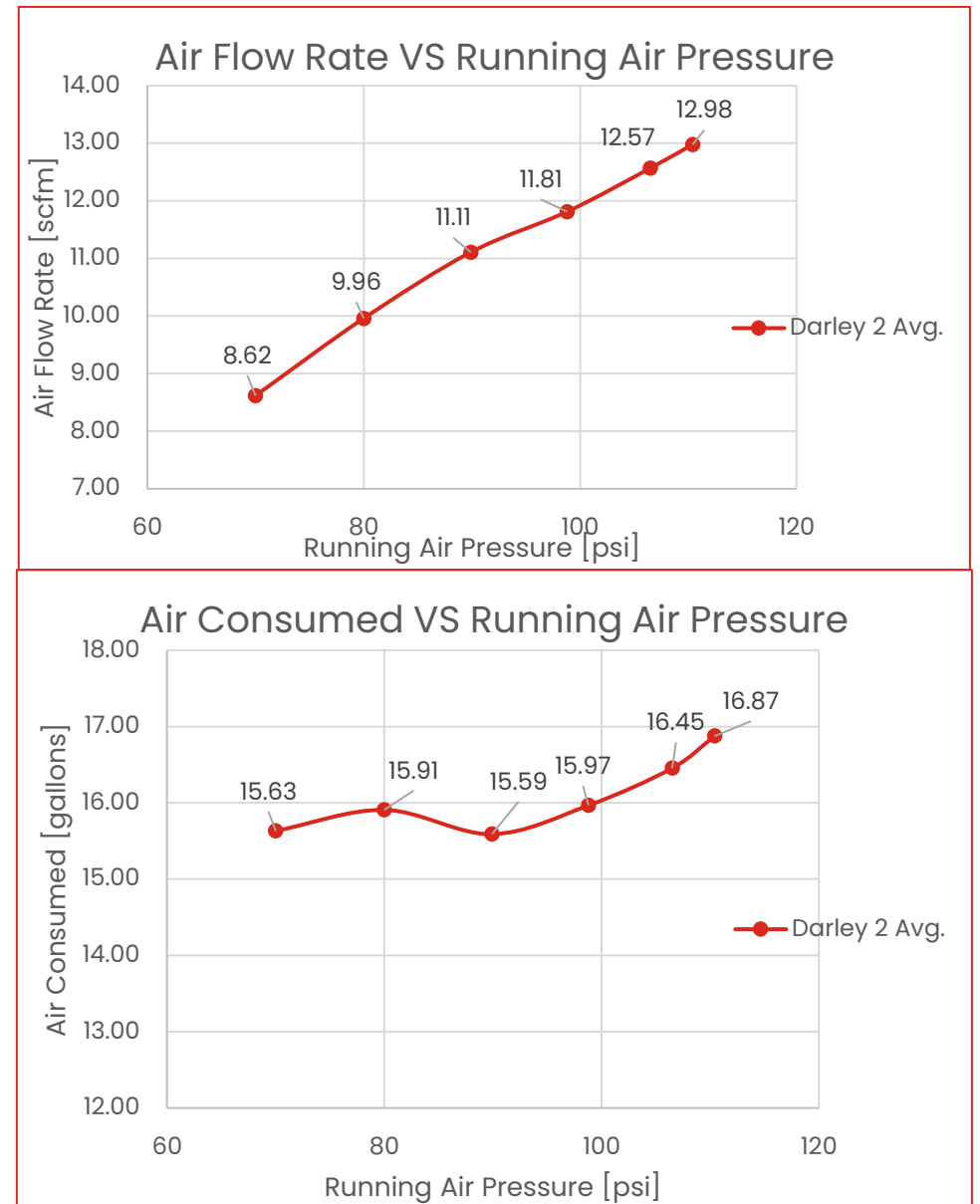


A 4" suction hose is the size required for 350 gpm ratings, which means a primer that can prime 2x 10-foot suction hoses with a 4" diameter would also be capable of priming the 250 and 300 gpm ratings as those require 3" suction hose.



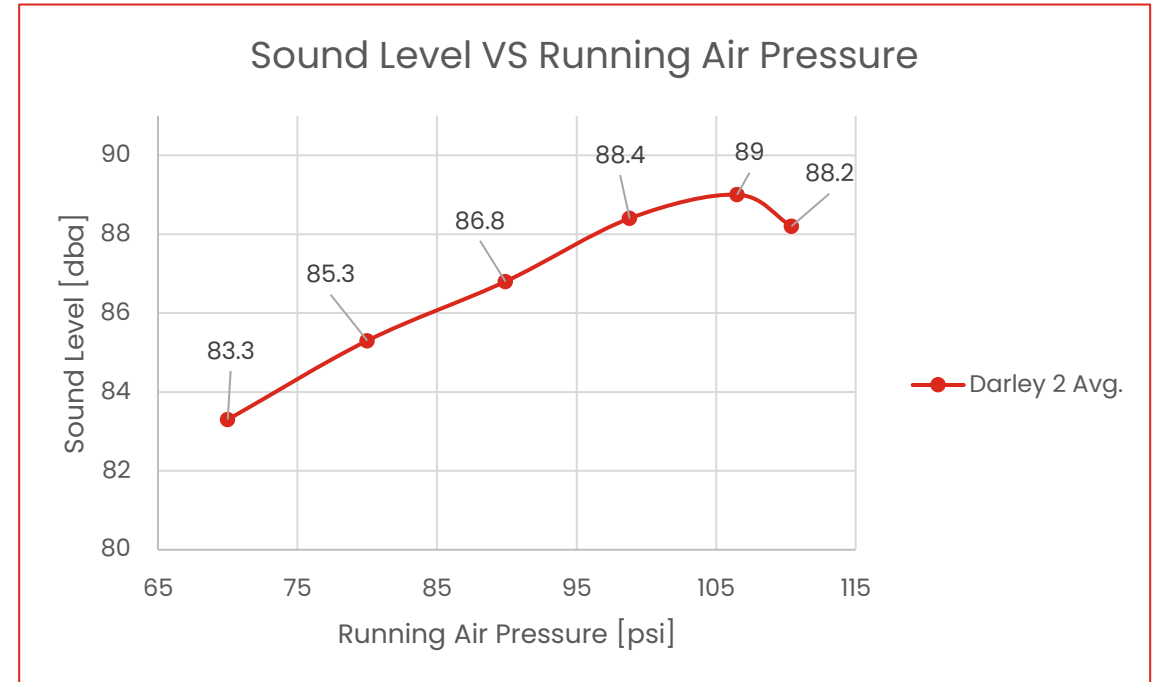
(1) 4" Suction Test at 10'

- The air flow rate and total air consumption is shown on the right
- The Darley Air Primer had a highest average flow rate of 12.98 SCFM @ 125 PSI set pressure
 - This means an air compressor capable of outputting more than 12.98 SCFM can be used to supply this air primer system for (2) 6" suction applications
- The total air consumption is based on the flowrate and prime time shown in gallons and is graphed on the right



(1) 4" Suction Test at 10'

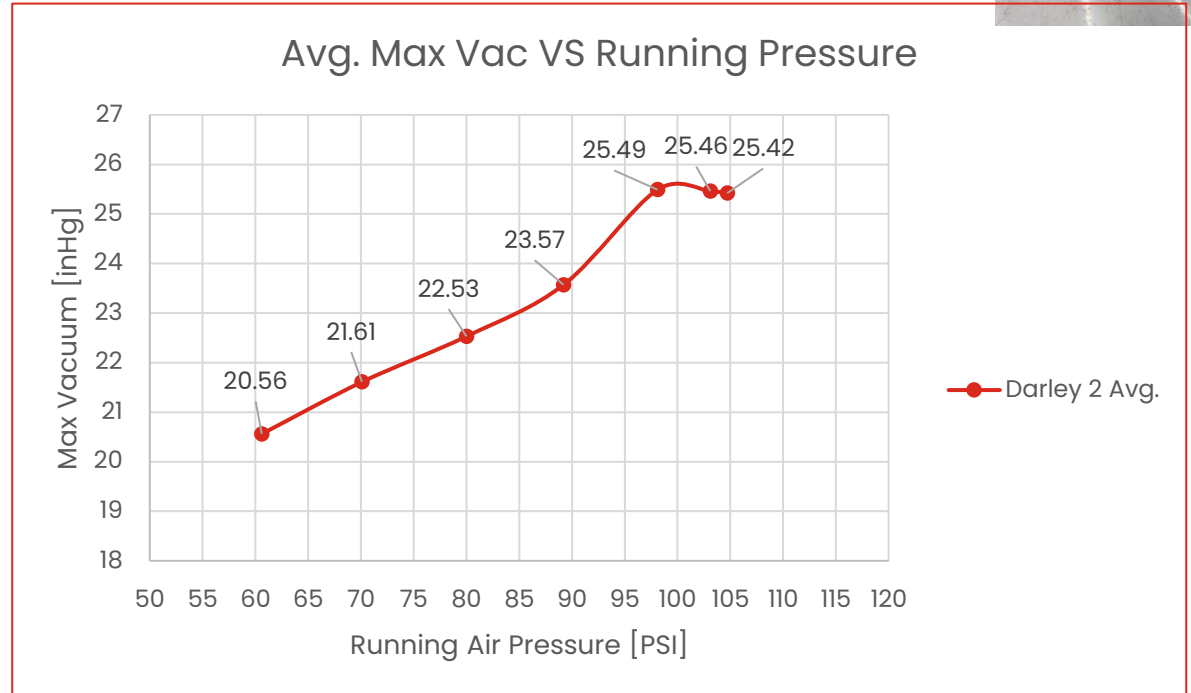
- The sound level for the (1) 4" Suction test was at an acceptable level
- Max Avg. Darley dba = 89



Max Vacuum Test

- Darley max vac AVG = 25.49 inHg
- Darley absolute max = 25.8 inHg

Darley Max Vac Avg.			
Set Air Pressure (psi)	Running Air Pressure (psi)	Max Vacuum (inHg)	Max Vacuum Air Off (inHg)
119.3	104.7	25.42	24.92
115	103.1	25.46	24.94
105	98.1	25.49	24.96
95	89.2	23.57	23.05
85	80	22.53	22.08
75	70.1	21.61	21.18
65	60.6	20.56	20.26



This test with two caps and no hoses allows us to find out the maximum possible vacuum a primer is capable of. China requires 25.1 in*Hg for their primers and NFPA requires 22.0 in*Hg for their primers.



Test Summary

10 Foot Suction Tests

- Prime time follows NFPA ratings for (1) 4" suction 10' high through 20' of hose, (1) 6" suction 10' high through 20' of hose, (2) 6" suction 10' high through 20' of hose, and meets the max vacuum requirement
- Air consumption is less than most common air compressor output (~15 CFM)

Max Vacuum Test

- Average max vacuum recorded was 25.49 at 98 psi running input air pressure
- Meets NFPA requirement of 22.0 (in*Hg)



Pressure Drop VS Air Lines

- The pressure drop increases as the length of hose increases.
- With a 20% safety factor built in, the Darley Air Primer should not run below 96 PSI to consistently reach the NFPA 22.0 inHg max vacuum standard.
- This data can be used as an estimated guideline to determine how long truck builders can route air lines from the compressor tank to the air primer.
- For example: if 3/8" OD (Darley PN# 1101923) air lines are used and the truck compressor is rated for 120 PSI, 20 feet of hose can be used to route from the compressor to the primer inlet

