WHICH AIR COMPRESSOR IS RIGHT FOR ME?

Buying an air compressor is much the same as buying an above ground vehicle lift or a tire changer. The above ground lift customer needs to identify the largest vehicle to be lifted. The tire changer customer needs to identify the largest wheel/tire combination that needs to be changed. The air compressor customer must identify the tool(s) or equipment that will consume the most amount of air at the highest pressure. The automotive equipment experts at Greg Smith Equipment have the knowledge to help our customers make the correct buying decision.

Your best "rule of thumb" is to always buy more air compressor than you need!

What is DELIVERED CFM?

This will be one of the most important numbers for you to consider when buying your new air compressor. (Assuming price is NO OBJECT) Many air compressor manufacturers will post their DISPLACED CFM numbers. DISPLACED CFM should not be considered when buying an air compressor. DISPLACED CFM is the CFM produced by an air compressor that is working at 100 % efficiency in a perfect environment. That scenario does NOT exist in your shop! You want to know the DELIVERED CFM! DELIVERED CFM is the AVAILABLE AIR made by the air compressor in a real life environment.
DELIVERED CFM is what runs your tools!
DELIVERED CFM will INCREASE when the PSI is DECREASED.
DELIVERED CFM will DECREASE when the PSI is INCREASED.
We recommend that you buy an air compressor that DELIVERS 1.5 times the CFM of the largest air consumption machine in your shop. If you will be using several air powered tools at the same time; then the CFM requirements of the "in-use" tools must be added together. Make sure that your DELIVERED CFM requirement is measured at or above the correct PSI.

What size MOTOR should I look for in an Air Compressor?

This should not be the determining factor when shopping for your air compressor. Some air compressor manufacturers (and motor manufacturers) use false advertising to imply that their "peak" horsepower is the same as their "normal run" horsepower. When the motor starts, "peak" horsepower may be as much as 5 times the amount of the "normal run" horsepower. The correct way to rate motor horsepower is to measure the horsepower after the motor is operating at the designated RPM and the starter windings have become disengaged.

One car may have more horsepower (BIGGER MOTOR) than another car, but that does not mean the car with the most horsepower is the fastest or the most efficient. There are many factors that contribute to the overall performance of a car AND an air compressor.

How do the compressor pump and motor relate to each other

Reciprocating air compressors utilize either a single stage or a two stage compressor pump to manufacture compressed air. The most efficient compressors are those that DELIVER the most amount of CFM while turning at the slowest RPM. A small or inefficient compressor pump that turns at a very high speed may deliver a large volume of air, but for only a very short time! Your Corvette may cruise at 50 mph in second gear! But for how long? The motor and compressor pump need to be matched perfectly to allow the compressor to operate at its maximum efficiency If the motor is too small, the compressor pump will not be "spun" at the correct RPM. The undersized motor may overheat (stall) in its attempt to power the too large compressor pump. If the motor is too large, the compressor pump may be "spun" at too many RPM, and the compressor pump will have a very short life span.

Of course, the size of the pulleys for both the motor and compressor pump can alter the RPM of the compressor pump. These pulley sizes can changed to increase or decrease the compressor pump RPM. However, to maximize the performance and longevity of the air compressor, the motor and compressor should be matched correctly.

Do I need a single stage air compressor?

Single stage air compressor pumps draw in atmospheric air and compress that air in a single piston stroke. Single stage air compressor pumps produce almost 150 PSI air in one stroke. It is normal for the single stage air compressor pump to deliver more CFM (at a lower PSI) than a two stage compressor pump. The single stage compressor pump is producing compressed air during every piston rotation. The single stage air compressor may have one cylinder or multiple cylinders. Each cylinder will deliver compressed air directly to the air receiver after the full piston stroke is completed. If you have multiple cylinders on your compressor, and they all have air filters; then you have a single stage air compressor. All cylinders are "drawing" atmospheric air into the cylinders. If your tools or equipment demand a high volume at lower pressure, the single stage air compressor may be your answer.

Do I need a two stage air compressor?

Many air powered tools require an elevated air pressure that can only be produced by the two stage reciprocating air compressor. Two stage air compressor pumps work very similar to the single stage air compressor pump. The difference is that the two stage air compressor pump compresses air in one cylinder and then moves that compressed air to another cylinder to be compressed again. The two stage air compressor pump is capable of producing compressed air up to 200 PSI. Two stage air compressor pumps must have a minimum of two cylinders. One cylinder is normally larger than the other. The larger cylinder (first stage-the one with the air filter) draws in the atmospheric air, and the piston compresses the atmospheric air to about 150 PSI. This compressed air is then transferred (via a finned tube to dissipate heat) into the smaller diameter cylinder where the smaller piston re-compresses this air to about 175 PSI.

This"double compressed air" is forced into the air receiver tank. An inline check valve prevents the compressed air from flowing back into the high pressure compressor cylinder from the air receiver. This inline check valve is also used in the single stage air compressor. The two stage air compressor pump may have multiple cylinders. However, there must be a minimum of one low pressure cylinder and one high pressure cylinder in each two stage air compressor pump.

What size air tank do I need?

The air tank stores the compressed air manufactured by the air compressor pump. The air compressor "temporarily shuts down" when the PSI of the air in the tank reaches the pre-set air pressure as determined by the setting on the pressure switch. When the PSI in the air tank drops below the minimum preset pressure, the air compressor turns on automatically, and the whole process of "making compressed air" begins. Air power tools, that operate in short bursts of air consumption, need only a small air reservoir to accommodate their demands. Sandblast cabinets, orbital sanders, and other high volume air consumption tools require a larger air tank with more volume. Air that has been stored in the air receiver tank is cooler than the air being produced by the air compressor pump. Air receiver tanks hold pressurized air and allow the air compressor pump and motor to rest (and cool down) when the desired pressure is achieved. If your air compressor pump and motor are too small and CANNOT deliver enough CFM, then a larger tank is actually a liability. The inadequate motor and air compressor pump MUST fill and pressurize the air tank BEFORE the air is delivered to your air tool. With a compressor pump and motor that are too small, the larger tank is a liability. Larger tanks=longer wait!

Remember that as the air pressure is increased, more useable air can be stored in a fixed area. Pressure is related to storage area. There is "more air" in a 60 gallon receiver pressurized at 175 PSI than in an 80 gallon receiver pressurized at 135 PSI.

Why do some air compressor motors have magnetic starters..and what are they?

The Magnetic Starter is the "thinking cap" for the motor of the air compressor. Magnetic starters are electromagnetically operated switches that provide a safe method for certain motors to be started under a large motor load. The overload relay inside the magnetic starters will prevent the supply voltage from energizing the motor if the starter detects a motor overload situation. Heaters (in series) are responsible for allowing current to reach the motor (and start it) or prevent the current from reaching the motor (preventing a motor failure). Magnetic starters will allow a motor (when properly sized to the compressor pump) to operate at a 100% duty cycle. A heavy-duty pressure switch can also be used (with some motors) to mimic the actions of a magnetic starter.

What is the duty cycle and how does it affect the operation of my air compressor?

Many air compressor pumps and motors are rated for continuous duty. It is OK if they do not shut off now and then. That is a 100% duty cycle. Other compressor motors need a periodic rest of perhaps three minutes out of every ten minutes to keep them from overheating. If the

air compressor runs for seven minutes and rests for three minutes, then the duty cycle would be rated at 70%. If 70% is the factory recommended duty cycle for your compressor, and the compressor runs more than 70% of the time, then the pump and motor will overheat, resulting in damage. A magnetic starter or a heavy duty pressure switch will increase the duty cycle of most motors. Most commercial grade air compressors use heavy duty motors with a 100% duty cycle. (When a magnetic starter is wired to the motor) A heavy-duty pressure switch will also increase the duty cycle on most motors.