



## CAGI Educational Document

### Ten Questions to Ask Before Buying That Piston Operated Air Compressor

**1 - WHAT ARE YOU USING THE COMPRESSED AIR FOR?** The type of work you do is probably the most important factor in determining compressor size. Do you intend to use air six hours per day/five days per week, or only occasionally? Are your demands for compressed air relatively constant during the day, or do they vary widely? Purchase a compressor designed for a duty-cycle which equals or exceeds your specific application requirements! **Also for sensitive applications such as pharmaceutical or food processing where the compressed air may come in contact with the actual process itself for example, it may be important to consider if an oil-free compressor along with proper filtration to meet the system requirements.**

**2 - WHERE WILL THE COMPRESSOR BE LOCATED?** Outdoor applications require special protection against water and freezing temperatures. Indoors, sufficient ventilation is crucial for successful operation since most reciprocating compressors are air cooled. Don't put the compressor in a closet, for example. Place the compressor at least three feet from the wall to ensure proper air flow and be sure the installation site is sufficiently ventilated to handle the heat generated by the compressor during operation. This includes being cognizant of ceiling height in the compressor room – avoid installations where heat emitted by the compressor gets recirculated and drawn back into the cooling air loop.

**3 - HOW MUCH PRESSURE (PSI) DO YOU REQUIRE?** The PSI, or pounds per square inch, capability of a compressor must match or exceed the PSI requirement of your hungriest air tools and pneumatic equipment which the compressor will feed. Check the manufacturer's specifications and pressure requirements for all of your pneumatic equipment. PSI also determines whether the unit should be a single-stage (125-135 PSI) or a two-stage (175 PSI) compressor. Also be aware of and size for pressure losses associated with piping and any and all pneumatic devices installed downstream from the compressor- including air dryers, regulators, filters, etc.

**4 - HOW MUCH AIR FLOW (CFM) DO YOU REQUIRE?** CFM, or cubic feet per minute, is a measure of air flow the compressor is capable of handling. CFM is measured in one of two (2) ways; first, as piston displacement, commonly referred to as "PD" which is a measure of the amount of air volume entering the compressor pump through the compressor intake. Another way CFM is measured is the actual delivered air being discharged by the compressor pump, commonly referred to as "ACFM." This is the amount of compressed air volume available to operate pneumatic devices and/or tools. "PD" at intake port will always be larger than "ACFM" at the discharge port as the compressor will lose some air due to blow-by during the compression process. "ACFM" is the true measure of the volume of air available to operate pneumatic devices and/or tools - make sure this is the number you are using for compressor sizing purposes. This is one topic where reading the "fine print" and understanding exactly what you are buying by asking questions is important to the successful and long term operation of your compressor and downstream pneumatic devices and/or tools.

**5 - WHAT MOTOR HORSEPOWER DO YOU REQUIRE?** Horsepower is directly proportional to the CFM rating of a compressor; typically, the higher the horsepower the more air (CFM) the compressor can produce. Don't rely solely on horsepower or attempt to buy the highest horsepower compressor you can afford. Let your CFM and PSI requirements determine horsepower for you.

**6 - WHAT SIZE AND TYPE OF AIR TANK DO YOU REQUIRE?** Air tanks help eliminate pulsation in the air line and provide storage when demand for air exceeds the capacity of the compressor. The larger the tank, the more pressurized air is available for work. The smaller the tank, the more the compressor has to work to keep up with the demand. A larger air receiver helps reduce the amount of starts per hour, thus provides a longer cool-down period; a consideration for piston compressors in commercial or industrial applications. Decide if your application requires a vertical or horizontal tank; this is determined by the physical location of the compressor and one's personal preference. Vertical compressors have a smaller footprint than a horizontal design and are typically only available on models rated up to 10 horsepower.

**7 - WHAT ARE THE ELECTRICAL REQUIREMENTS OF THE INSTALLATION?** Incoming electrical service is very important to identify and understand before purchasing a compressor. Voltage will determine the horsepower capacity available without expensive modifications. The standard voltage for homes is 110 volts. This voltage will only operate compressors up to three horsepower. In the United States, Canada and Mexico the following voltages and phases are available:

3phase, 60 hertz, 200-208- 230 - 460 volt (or 575 volt in Canada)

1 phase, 60 hertz, 115- 208 or 230 volt

NOTE: When in doubt, always have a qualified electrician review electrical requirements prop to buying an air compressor. It's also very important that electrical installation only by performed by a qualified and licensed electrician for safety reasons and ensure all local codes and warranty requirements are met.

**8 - WHAT CONTROL SYSTEM DO YOU REQUIRE?** All reciprocating air compressors require a control system to regulate the compressor operation in accordance with air demand. Typically one will find one (1) of three (3) types of controls on the compressor; usually dictated by motor horsepower size and application design parameters.

*Start/Stop Control* is used for applications where air is not required continually, allowing the compressor sufficient cooling time. When system pressure falls below the set start-up pressure, the compressor will automatically start. When the cut-off pressure is reached, the compressor will automatically shut-off and will not start again until the system pressure falls below the minimum start pressure.

*Constant Speed Control* keeps the compressor from excessively starting and stopping. As with start/stop control, it has a minimum start pressure and a maximum cutoff pressure. In the "constant speed" mode of operation the compressor main drive motor is continuously running as the compressor pump cycles between compressing air and free wheeling (not compressing air). This feature prevents premature motor failure and minimizes operating costs associated with high amp-draw. Here's a rule of thumb: if the compressor starts more than six to eight times per hour, you should operate constant speed control or choose a larger compressor. If the compressor starts less than six times per hour, start/stop control should be sufficient.

*Dual Control* allows the compressor to operate in either start/stop mode or constant speed control mode. This control method allows the user to easily adjust the control mode dependent upon compressed air usage. Know your requirements and purchase accordingly! *Both constant-speed and dual-control are*

*typically found only on larger reciprocating compressors (10HP and larger) which are suited for more heavy duty commercial and industrial applications.*

**9 - IS AN AIR DRYER OR FILTRATION REQUIRED?** A byproduct of compressed air is water. If a dryer is in use, an air cooled aftercooler is highly suggested to ensure proper operation of the air dryer, unless the dryer is a “high temperature” style dryer. If water is a concern in your application, consider the use of a refrigerated air dryer in your air system since air cooled aftercoolers will only remove a partial amount of water in the compression process. **Along with a properly sized dryer, it is recommended that you also install the proper filtration such as for a general application using a 1 micron pre-filter (moisture/particle removal) to the dryer and .01 micron coalescing (oil removal) after-filter to the dryer. Further environmental protection can also be achieved by use of a Oil/Water Separator which will filter discharge condensate from dryers, filters and air receivers prior to sending down the drain.**

**10 - WHAT COMPRESSOR FEATURES SHOULD YOU CONSIDER?** All applications are different and for this reason it’s important that you discuss your specific application with a knowledgeable source who can lead and guide your decision making process. An air compressor can be a major investment for the average retail/ commercial user. When sized properly and with the proper options, you will get years of satisfaction out of your investment not to mention the air quality you need to ensure longevity of your air tools and pneumatic devices. Sized incorrectly or with insufficient options to meet the requirements of your specific application and you will know it almost immediately.

For this reason we strongly suggest you consult with a compressed air system expert who is a member of the CAGI (Compressed Air & Gas Institute/ [www.CAGI.org](http://www.CAGI.org)). These businesses are true air system experts who can help you make the correct choices in our air compressor selection.