



## ***Compressed Air System FAQ's***

Our customers ask us a ton of questions. We value each one as an opportunity to help them meet their compressed air needs and achieve their bottom line goals. To help you benefit from the wisdom of your predecessors, we've put together this list of frequently asked questions about air compressors and related equipment.

### ***Air Quality Questions...***

***(Q): My compressor runs hot. What should I do?***

**(A):** Elevated compressor temperature may be caused by restricted air, water or oil flow, a low oil level, or excessive ambient temperature. Check the water flow, pressure and quality, and clean the heat exchanger as needed. Check the compressor oil level and add oil as required. Remove any flow restrictions and replace parts if necessary. Make sure your compressor and compressor room are properly ventilated. Check with the manufacturer to determine the maximum operating temperature.

***(Q): What are the most common problems caused by water in compressed air systems?***

**(A):** Washing away of required lubrication, increased maintenance, sluggish pneumatic equipment, rust, instrumentation clogs, paint spotting, airline freeze-up and dramatically shortened tool life.

***(Q): Why am I getting water in my air lines?***

**(A):** Condensation in the tank and air lines is a natural occurrence when compressing air. To prevent water in the lines, drain the air receiver frequently to eliminate the condensate. Consider adding an automatic drain to eliminate the manual process of draining the tank. Add a moisture separator to your air line and drain on a regular basis. If you have an air dryer, water in the lines may be a sign that you need to repair or replace your dryer. Have the dryer serviced to see if that eliminates the water problem.





***(Q): What is the hidden cost of poor air quality?***

***(A):*** Poor Air = Repair Cost + Replacement Cost + Lost Production.

***(Q): Why am I getting low air pressure at the point of use?***

***(A):*** Low pressure can be caused by a number of factors. You may have air leaks in the distribution piping or clogged filter elements. The pressure at the compressor discharge may not be sufficient to overcome system pressure drop. Check the lines, connections and valves for leaks. Clean or replace filter elements. Raise the compressor discharge pressure as a last resort.

***(Q): The pressure at compressor discharge is too low. What should I do?***

***(A):*** For systems with modulating load controls, the air capacity control system may not be adjusted properly. Follow the manufacturer's recommendation for adjustment of the modulation system. In reciprocating compressors, another cause may be worn or broken valves or the wrong setting on your air pressure switch. Check the valves and repair or replace as required. Follow the manufacturer's recommendations for setting the air pressure switch. If none of the above solves the problem, the low-pressure problem may be caused by an undersized compressor. You may require additional capacity (CFM) to maintain the desired system pressure.

***(Q): What can I do to prevent oil in the air lines?***

***(A):*** All lubricated compressors send oil downstream. The quantity will depend on the type of compressor. In a rotary screw compressor, oil in the lines may be due to faulty separation equipment or a compressor oil level that's too high. Check the air/oil separation system and change the separator element if necessary. Also follow the manufacturer's recommendations for the proper oil level. In a reciprocating compressor, the force feed lubricator may be set at an excessive level. Follow the manufacturer's recommendation for proper feed rate. If oil carryover continues to be a problem, you may need to add a coalescing filter to your system.





***(Q): Why am I getting dirt or rust in the air lines?***

***(A):*** As compressed air lines age, dirt can accumulate in the air lines and rust can be caused by water carried over to the piping system. To prevent damage to your equipment, install filters at the point of use. When replacing or adding piping, consider the use of copper or extruded aluminum piping which will not rust. Adding a dryer to remove water before the air enters the piping system will reduce rust problems.

### ***Compressed Air Cost Questions...***

***(Q): What is the true cost of compressed air?***

***(A):*** 15% fixed cost for the compressor, installation, depreciation and insurance. 20% operating cost for inspection, maintenance and repair. 65% power cost for energy and demand to operate the system at \$0.06 per kWhr, the estimated cost of compressed air is \$0.02 per 100 CFM (\$0.0002 per cubic foot). A 10 HP compressor delivering 35 cfm = \$0.007/minute, \$0.42/hour, \$10.08/day, \$302.40/month or \$3,628.80/year.

***(Q): What is the cost of pressure drops?***

***(A):*** Avoid costly pressure drops and save money. NOTE: A 10 HP compressor producing 35 CFM at 100 PSIG and connected to a straight run of 100 feet of 1" diameter pipe will result in a .27 PSI pressure drop. Every 90° elbow will equal to an additional 25 feet of pipe. Four elbows, another loss of 1.12 PSI. Each lost pound of pressure equals the loss of .5 percent horsepower. Horsepower equates to power; power equates to money.

***(Q): What is the cost of an air leak?***

***(A):*** Eliminate air leaks and save money. The cost of a 1.8" air leak at 100 psi (26 cubic feet per minute) represents \$0.31 per hour or \$313 for every 10,000 hours of operation. Fix the leak and save money.





### ***Air Compressor Efficiency Questions...***

***(Q): How can I improve the energy efficiency of my rotary screw compressor?***

**(A):** The most efficient rotary compressor is one that is fully loaded, providing the maximum flow per brake horsepower. When an application has long periods of little or no demand for compressed air, you should have a compressor that can shut itself off.

***(Q): Can I really recover energy from my compressed air system?***

**(A):** As much as 80-93 percent of the electrical energy used by an industrial air compressor is converted into heat. In many cases, a properly designed heat recovery unit can recover anywhere from 50 to 90 percent of this available thermal energy and put it to useful work heating air or water. In the winter, you can supplement your building's heating system with temperature controlled, heated make-up air from your compressor. During the summer, you can isolate the waste heat from your building's comfort conditioning system. The amount of energy that you can save through recovery is a function of your current heating system efficiency.

### ***Air System Equipment Questions...***

***(Q): Can an air dryer really make much of a difference?***

**(A):** Hot air holds more water. Every 20° F increase in temperature doubles the amount of moisture suspended in air. Every 20° F decrease in temperature reduces the amount of moisture suspended in air in half. An aftercooler or air dryer can eliminate this fluctuation. Air entering a 10hp compressor at 75° F and 75 percent relative humidity would produce 6.3 gallons of water per day. An air-cooled aftercooler with a separator would remove 4.3 gallons per day and a refrigerated air dryer would remove an additional 1.7 gallons. Only .3 gallons would be left within the 50,400 cubic foot of compressed air.





***(Q): How much water is generated by my air system?***

**(A):** One 100 CFM compressor operating at 100 PSI will generate 18 gallons per day at 90° F and 50 percent RH. About 60 percent of this moisture will be removed by the aftercooler. The remainder will pass into your compressed air system if a dryer is not installed.

***(Q): Which filters and dryers do I need for my application in order to eliminate moisture and contaminants in my airlines?***

**(A):** This depends on the application and required dewpoint. For most applications, a 35° F dewpoint is sufficient, which can be provided by a refrigerated air dryer. For outdoor applications, a desiccant dryer will be necessary to provide a -40° F dewpoint. Filters will provide various levels of contaminant removal and can be selected according to the application requirements.

***(Q): How many cubic feet does a receiver hold?***

**(A):** Only stored air above the pressure being used is defined as useful free air. Majority of pneumatic tools and work processes only require 90 to 100 PSI. Storing compressed air above this working pressure provides a surplus of useful air that can accommodate work demands. A 120-gallon receiver at 175 PSI stored provides 193 cubic feet of compressed air.

***(Q): What size piping is needed in a properly designed system to minimize pressure drop?***

**(A):** This would depend on the capacity (CFM) of your air compressors, the required pressure and the total length of piping in the system. By knowing those three factors, standard tables can be used to determine the size of pipe required to minimize pressure drop. It is also important to know the number of valves and elbows in the system, as each one counts as an equivalent length of straight pipe. Size piping for the maximum CFM required and include the current system capacity and possible future expansion in your piping plan.





### ***Compressor System Maintenance Questions...***

***(Q): What kind of maintenance should be done to my compressor?***

**(A):** On oil-lubricated units, you should check the oil level regularly and change it as specified in the owner's manual. Also, change the oil filter as the manufacturer suggests. Clean or replace the air filter on a regular basis. On oil-less units, the air filter must be kept clean or debris will enter the compression chamber, resulting in high repair costs. Remember to drain condensate from the tank regularly.

***(Q): What are the main areas of a compressor package that need maintenance?***

**(A):** Compressor, heat exchanger surfaces, air lubricant separators, lubricant, lubricant filters and the air inlet filter.

***(Q): How can I tell if my drain valves are operating properly?***

**(A):** Routinely inspect condensate drains. Improper operation will exhaust compressed air to ambient or flood compressed air system with liquid water and oil. Clear tubing is recommended between electric drain and condensate collection point - a transparent tube provides easy inspection of drain operation.

