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Spend a little time to analyze your needs before buying an air compressor. Good decisions up front will pay off well for your shop later on.

At first, selecting an air compressor seems so simple. How tough could it be? All you have to figure out is how much air you need and decide how much you want to spend. Right?

Then, when you start poking into it, you discover all sorts of things you have to decide on. At that point, it seems as though you can't decide on anything without first deciding on something else, which in turn depends on yet another decision, which—sure enough—goes back to the first decision you had to make, and you couldn't have made that without knowing all the rest. It's a real cat's cradle.

In fact, choosing an industrial air compressor really comes down to just two main topics: size and features. With regard to size, compressor capacity and operating pressure take the forefront. Features—and the quality of each—also should be closely evaluated prior to a purchase. Let's break this down a bit more and make a complicated decision simple again.

Decisions. Decisions.

They can be maddening. Decision Wheel to help clear your thinking. You can start at any point on the w

Deciding on the size

Look at the compressor selection process in a series of logical steps to make the process easier. To begin with, calculate the amount of CFM (cubic feet per minute) required in a shop to determine the necessary capacity of a compressor. Begin by adding the CFM requirements for all the tools that may be used simultaneously, then add another 30% of that to allow for unknown or uncommon compressor usage. The CFM demand will be on the tool itself or in the owner's manual. Capacity or volume—in other words, CFM—can be figured three ways:

1. Displaced CFM (DCFM) is simply a mathematical calculation of the bore, stroke and rpm. It does not take into account any of the important variables, like temperature, atmospheric

pressure, humidity, friction or heat dissipation, therefore it means almost nothing in the real world.

2. Standard CFM (SCFM) is a better measure of reality. SCFM is the flow of free air in a standardized environment— such as 14.5 psi atmospheric pressure (the pressure at sea level), 68 F and 0% humidity. Since this is a standardized metric, it's the best figure to use in comparing air compressors across the board, much like apples to apples. Specific needs will affect this, however. Someone working in mile-high Denver will have different requirements than someone working at sea level in Louisiana.

3. Actual CFM (ACFM) is the number most needed because it figures in the variables that apply to a specific situation. It will give the output of the pump for the actual working conditions. But, ACFM is a hard figure to get precisely because it does require site-specific data and calculations that may be best left to an engineer.

For selection purposes, your best bet is to compare air compressors based on the SCFM ratings. Note, too, that CFM often is shown at various pressures. These numbers can be very useful in determining if a compressor produces enough volume for the application, but they can be confusing when you try to compare different compressors or compressors rated at different pressures. Again, SCFM is best. It levels the playing field.

Remember to add in that extra 30% of CFM to provide a reasonable buffer against the unforeseen, but don't exceed it. There's no point in buying more capacity than you'll ever need. You just don't want to buy less.

CFM also will be important to know when considering a single-stage compressor versus a two-stage model. Begin by listing the minimum operating pressure requirements for the tools you're going to use, which will indicate whether a single-stage compressor or a two-stage compressor will be needed.

Single-stage compressors are fine up to 150 psi. Higher pressures will require a two-stage unit. A single-stage compressor typically will have a higher CFM rating because the cylinder draws in air and compresses it with every rotation. A two-stage model compresses the air up to an intermediate pressure in one or more cylinder(s) and then passes it on to another cylinder to

finish the job. Because the air is typically passed through an intercooler between stages, a two-stage compressor is more efficient at higher pressures.

One final thing to keep in mind regarding size is the peak air demand requirements. Plants tend to use constant air for most applications, such as blow-down guns and air grinders. At some point, the plant may be using more air, but the tank will level that out. Still, it's a good idea to have a backup compressor in the event that pressure drops.

Deciding on the features

Durability is a key term to remember when evaluating compressors. Durability means longevity, and longevity means cost-efficiency over time. Invest in quality up front and it will pay long-term rewards. That means you'll want to consider long-term features, such as a cast-iron cylinder, a heat-dissipating head, an efficient cooling system, structural protection for critical components and fittings, a heavy-duty steel frame and powder-coat or electrostatically applied paint to resist chipping and wear. Check on the service life expectancy of various models before making a purchase, as well.

Keep hose diameter in mind when surveying a compressor's features. Don't skimp on ¼" hose if 3/8" is needed to handle a load of more tools or longer runs of hose. Be realistic about the actual needs, too. Make sure the larger hose will justify its extra weight and cost.

Beyond features, ask questions about the supplier company along with the reliability of its parts and service support. This can indicate quality features—or the lack thereof—that are not readily visible. Are air compressors the primary or sole business of the supplier? Does the company make its own products or source them from a third party? How long has the company been in the air compressor business? (All we know about the future is what we know about the past, so look at the company's history in this market.) Can the supplier answer questions clearly and explain the subtleties that only an expert would know? What about the availability of technical help, parts and service and the distribution network?

Before finalizing the decision, take a moment to calculate not just the initial price, but the long-term costs of the purchase. When it's all added up, what will the compressor really cost over time? Consider how it will be used, how often and how long. The big question in the selection decision is this: What would it cost to be wrong?

Overall, the most critical issue to keep in mind from the beginning is the job analysis. Every job application has its own requirements and, consequently, its own set of questions. Be sure that you create a realistic checklist for the specific work situation before making a final decision.

Deciding on the solution

Remember that it makes little sense to buy more capacity than you need, but it makes no sense at all to buy less. Ultimately, you're not just buying an air compressor—you're really buying a solution to a problem. You can try to get by with just one aspirin, but you'll still have the headache. It's important to thoroughly analyze the decision points early on in order to find the best solution for the present and future.

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