Useful Things to Know

The Importance of an Efficient Air System

An efficient compressed-air system does not just happen. Ensuring minimum pressure loss and the removal of contaminants (water, compressor oil, dirt, rust, pipe scale and other foreign materials) takes proper planning. An inefficient system results in higher energy costs per unit of compressed air, improper or erratic tool operation, shortened component life, reduced capacity and the build-up of rust or sludge in the main and branch lines. Problems such as these can cost businesses millions of dollars a year.

Laying out a good compressed-air system takes into account the size of the compressor, as well as how to prepare and distribute the air. Many inefficient systems in operation today are the result of too many add-on components.

Air Quality

Important factors to consider in achieving and maintaining air quality standards with air-cooled compressed-air equipment include:

1. The location of the compressed-air equipment, which should be based on delivering the desired compressed-air quality and should:
   - Control the ambient temperature.
   - Supply the required cooling airflow.
   - Prevent negative air pressure.
   - Use ducts to remove exhaust heat.
   - Remove the radiated heat.
   - Recover any wasted heat.
   - Provide the correct airflow pattern across air-cooled compressed-air equipment by installing intake louvers in the wall.
   - Position equipment so that the cooling fan exhaust is in the direction of the airflow.
   - Keep the outside of the air-cooled heat exchangers clean.
2. When installing air-cooled compressed-air equipment, consider the pressure dew point of the compressed air exiting the air dryer, which is dependent upon proper installation. Some symptoms of poor installations of air-cooled compressor equipment are:
   - High compressor operating temperatures.
   - Compressor shutdowns at high temperature.
   - High-discharge air temperature.
   - Reduced compressor output.
   - Increased refrigerant suction pressures on the air dryer.
   - Moisture downstream of the cleanup equipment.

Sizing an Air Compressor

Sizing an air compressor requires a logical sequence of steps to determine the proper amount of air for the application. The following lays out a systematic approach for making the right decision.

Step 1 Determine your air requirements. Use the chart at the bottom to determine your average CFM requirements per tool or check with the manufacturer. In the example below, we are sizing the compressor for a typical auto body shop.

Step 2 Once all the air requirements have been determined, total the CFM needed for the air compressor. In this example that would be 80 CFM.

Step 3 Allow for leaks and growth of the business.

Step 4 Duty Cycle: How long do you expect the compressor to run pumping air during working hours? In this example, 70% of the time you expect the compressor to be providing air to the equipment. (0.7 x 80 CFM = 56 CFM). This is the amount of CFM you would use to determine the proper compressor.

Step 5 Determine the required pressure (psig). Most air tools require 90-100 psig. Other tools, such as tire changers, require up to 150 psig. Check with your equipment manufacturers for psig recommendations on other equipment.

Step 6 Check for voltage and phase where the compressor is going to be located. If this information is not available, then have a qualified electrician check for voltage and phase. This is a critical step in sizing and selecting the proper compressor.

Step 7 Determine the compressor tank (receiver) size. Most manufacturers offer standard sizes based on the CFM of the compressor (the most popular sizes are 80, 120 and 240 gallon).

Sizing & Selecting an Air Compressor

Example

Service Shop Tools

HOW MANY	TYPE TOOL / EQUIPMENT	CFM EACH	CFM TOTAL
	Impact Wrench, 1/2" Drive	3	
2	Impact Wrench, 3/4" Drive	7	14
2	Impact Wrench, 1" Drive	10	20
2	Tire Changer w/Inflator	4	8
2	Grease Gun	4	8
1	Oil Pump	4	4
1	Parts Washer (Air-agitated)	2	2
4	Lift (in-ground) 8000 lbs (Add 1 CFM for each additional 1000 lbs.)	6	24
	Air Jack	4	
	Cabinet Blaster w/5/64 Nozzle	7	
	Cabinet Blaster w/1/8 Nozzle	15	
	Cabinet Blaster w/5/32 Nozzle	20	
	Other Tools / Equipment		
	Total CFM in Service Shop	80	

Body Shop Tools

HOW MANY	TYPE TOOL / EQUIPMENT	CFM EACH	CFM TOTAL
	"DA" Sander	12	
	6" Grinder	10	
	Panel Cutter	8	
	Plasma Cutter	6	
	Spray Gun, Touch-up	4	
	Spray Gun, Professional	9	
	Spray Gun, HVLP	11	
	Paint Shaker	3	
	Respirators (Per Man)	4	
	Other Tools / Equipment		
	Total CFM in Service Shop		

Total CFM required for all tools/equipment listed @ 100% duty cycle: 80 CFM

Total CFM needed = 80 CFM x 0.7 (duty cycle): 56 CFM

Note: All above tools/equipment operate at approximately 90-100 PSI, except tire changer air jacks and in-ground lifts, which will operate faster and more efficiently on pressures up to 150 PSI.

There are several different models of Speedaire compressors to fit this application. Consult the Grainger catalog for details.

Other items to determine:

Electric motor voltage	200-208, 230, 460
Electric power phase	single, three
Compressor tank size	60, 80, 120