Two 300HP air compressors are operating in tandem to load and unload. The air compressors are rated for 1,325 at 150 PSI and the average flow meter readings from these two machines were 720 CFM or 54% of full load of one air compressor. Both compressors consume a total of approximately 379 kW. At $0.14 per kWh this would equal a yearly cost of $38,000 using a yearly operational load of 8,400 hours. One compressor should be set as lead and the other as lag with the second compressor only coming on when needed – the potential annual savings of $60,000 from conservation and reduction of pressure can save 115 CFM by shutting off one compressor, which is a total potential savings of approximately $100,000 per year. Investment would be less than $2000 in maintenance or service cost.

While this is an extreme example, he gives you an idea of what could happen if two compressors are running together without any kind of evaluation and control set up. Here are some of the common scenarios that I have seen over the years:

- **Big/little compressor both with modulation control**—the big compressor should be set up as a baseload and the little compressor should be taken out of modulation if possible and set to load and unload. It’s very inefficient to load and unload the larger compressor.

- **Two compressors with modulation load/no load controls**—modulation unit should always try to be used as a baseload as it is least efficient in any part load situation. The system may need to have an appropriately sized receiver at least three times the volume of the machine. For example, a 50HP 200 CFM load/unload compressor should have a 660 gallon receiver.

- **VFD compressor used with load/no load or modulation control compressor**—always have the load/no load or modulation control compressor as a base load and trim with the VFD unit.

- **Control gap can occur in any system** when a VFD unit cannot turn down enough to meet a lower demand and goes to a load/unload scenario being less efficient—this also can cause a second machine to start up due to a pressure drop, which causes the two machines fight each other.

If you are running a 50HP and a 75HP compressor and they are both sharing loads for two shifts five days a week with power costs at $0.15 per KW, you could potentially be wasting 30 HP, or $20,000 annually, in energy costs. The savings goes up and down with the connected horsepower of two machines that are not playing well with each other.

The first step is to have your compressor technicians set up the compressors to operate most efficiently for the controls that they have for the average load in your plant. Unfortunately plant loads vary and a control set up done this month may not be appropriate 90 days from now.

A more comprehensive solution would be to evaluate your compressor system for usage and determine if the existing units can be run efficiently with a simple microprocessor control panel. You may also have to add receiver capacity and certainly look for air abuse as well as leaks in the plant.

If you have a big compressor and a little compressor and they both seem to be working their hearts out and they didn’t use to, then you may have a control problem. Take the time to get a qualified person to look at them and give you the best advice on how to run your system. This could save you a substantial amount of money over the next three years.

Need some assistance? Please call Frank Lederer at 508-351-1817 or email: FLederer@HopeAir.com.