La reproducción de este artículo no busca un beneficio económico, sí apunta a un major entendimiento y comprensión del funcionamiento de equipos de aire comprimido. El artículo original se publicó en: US Department of Energy Compressed air tip Sheet #4 August 2004 Consulte al autor.

Analyzing Your Compressed Air System

The first step in analyzing a compressed air system is to determine your compressed air needs. Compressed air needs are defined by the air quality and quantity required by the end uses in your plant. Assessing these needs carefully and understanding the difference between air quality and air quantity will ensure that a compressed air system is configured properly. Determining your pressure and demand load requirements are also important steps in analyzing your compressed air system.

Air Quality

Air quality is determined by the air dryness and contaminant level required by end uses. Learn the actual dryness level needed and the maximum contaminant level allowed for reliable production. Overtreating air beyond the required dryness and allowable contaminant level wastes money and energy.

Air Quantity

The required compressed air system volume can be determined by summing the requirements of your compressed air applications and process operations (taking into account load factors) and the duration of such volumes by those applications. The total air requirement is not the sum of the maximum requirements for each tool and process, but the sum of the average air consumption of each.

Pressure Requirements

The minimum required discharge pressure level must take into account the different pressure ratings of compressed air applications and processes as well as the pressure drops from components in the system. Too often, low or fluctuating pressure at end uses is misdiagnosed as not enough discharge pressure.

Pressure drop is a term used to characterize the reduction in air pressure from the compressor discharge to the actual point of end use. Pressure drop occurs as compressed air travels through the treatment and distribution system. Excessive pressure drop will result in poor system performance and excessive energy consumption. A pressure profile is a series of measurements of compressed air pressure at different points in the system, and allows identification of system components that are causing excessive pressure drop.

Demand Load Requirements

Another key to properly designing and operating a compressed air system is analyzing a plant's compressed air requirements over time, or load profile. The variation of demand for air over time is a major consideration in system design. Plants with wide variations in air demand need a system that operates efficiently under part-load. In such a case, multiple compressors with sequencing controls may provide more economical operation. Plants with a flatter load profile can use simpler control strategies.

Getting Started

The following is a seven-step action plan from CAC *Fundamentals of Compressed Air Systems* to analyze and improve your compressed air system:

1. Develop a basic block diagram of your compressed air system.
2. Measure your baseline (kW, pressure profi le, demand profi le, and leak load) and calculate energy use and costs.
3. Work with your compressed air system specialist to implement an appropriate compressor control strategy.
4. Once controls are adjusted, remeasure to get more accurate readings of kW and pressures, and to determine leak load. Recalculate energy use and costs.
5. Walk through to check for obvious preventive maintenance items and other opportunities to reduce costs and improve performance.
6. Identify and fi x leaks and correct inappropriate uses – know costs, re-measure, and adjust controls as above.
7. Begin implementation of continuous improvement programs.

Fuente: U.S Department of Energy
Energy Efficiency and Renewable Energy
EERE Information Center 1-877-EERE-INF (1-877-337-3463) www.eere.energy.gov