KAESER COMPRESSORS

COMPRESSED AIR SYSTEM LEAKS:

The Cost, Common Culprits, Detection, and Repair

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Imagine leaving your doors and windows open during the coldest winter days. Your furnace would run nonstop to try and heat your house. Your energy bill would skyrocket. Your home would still be chilly, you'd scramble to find other ways to keep warm, and your furnace would wear out more quickly.

Now think of the equivalent scenario in a compressed air system. You should be thinking of the costs associated with compressed air leaks.

In this paper, we'll discuss how many companies are losing thousands of dollars each year to compressed air system leaks. We will address where leaks commonly occur, leak detection methods, and practical advice for an audit and repair plan. We'll explain why an ongoing leak detection and repair program can be one of the most cost-effective measures a company can use to benefit its bottom line.

The Cost of Compressed Air System Leaks

Compressed air systems are in nearly every industrial facility in the United States, and the undeniable fact about those systems is: they all have leaks. The U.S. Department of Energy, supported by countless system audits, estimates the average leakage rate is 25 percent. In fact, some plants lose as much as 80 percent of their compressed air to leaks. So, if compressed air systems account for an estimated $5 billion per year in energy costs, that equates to a large amount of energy needlessly wasted and millions (if not billions) of dollars spent on lost air. In addition to added energy consumption, leaks also cost compressed air users by impacting productivity and equipment life.

Let's take a closer look at how leaks can translate to large amounts of energy and money being wasted on a daily basis.

Wasted Electricity

Compressed air leaks are simply demands for air that create no value. Further, they consume flow needed by other productive uses. This often results in significantly decreased pressure at the points of use. To compensate, some users will then turn up the pressure at the compressor, which only makes things worse since a leak will waste more air at higher pressure. We can calculate the annual energy cost for each individual leak with the following formula:

Annual cost of a leak = Leakage rate (cfm) x kW/cfm x operating hours x $/kWh

The following examples assume a typical compressor efficiency of 18 kW/100 cfm (.18 kW/cfm), an electric rate of $0.05 per kWh, 100 psig and nearly continuous operation:

- 1/16" leak at 100 psig: 6.5 cfm x .18 kW/cfm x 8,000 hours x $0.05 per kWh = $468 per year
- 1/8" leak at 100 psig: 26 cfm x .18 kW/cfm x 8,000 hours x $0.05 per kWh = $1,872 per year
- 1/4" leak at 100 psig: 104 cfm x .18 kW/cfm x 8,000 hours x $0.05 per kWh = $7,488 per year

Notes:

- The cfm flow through a leak varies with the air pressure, and the size and shape of the orifice.
- Compressor efficiency for a particular compressor can be found on the CAGI data sheet for that model.