



Air Demand Analysis

Compressed Air Assessments

Improving system performance

In the course of helping thousands of customers save millions of dollars through compressed air energy best practices we have improved conventional air audit techniques to develop our unique Kaeser Air Demand Analysis (ADA) program. No other approach to compressed air system analysis offers this combination of comprehensiveness, convenience, and affordability.

Analysis

Suitable for analyzing large or small systems, Kaeser's ADA is an exceptional tool. With the data we gather, our compressed air specialists identify areas for improvement in both energy savings, air delivery, and pressure stability throughout your plant.

Efficiency

Our field service experts have the knowledge, experience, and tools to study true life cycle costs. They can evaluate your air system and make solid recommendations that will greatly reduce your energy costs and even increase productivity. More efficient systems idle less, run less, and as a result, last longer.

Reliability

Maintenance costs can also be lowered. In fact, our customers typically find that a properly operating system will reduce their preventive and trouble-shooting activities by as much as 30%. Improving system pressure stability leads to reduced product defects and material scrap, better air quality, and reduced equipment downtime due to pressure fluctuations.

Benefits of an ADA

Significantly reduce energy costs by identifying and eliminating inefficiencies in your system.

- Reduce production scrap/waste by providing consistent pressure to production equipment.
- Cut air compressor maintenance costs by optimizing run time and reducing excess cycling.
- Reduce production equipment maintenance costs through improved air quality.
- Minimize downtime by reducing compressor maintenance intervals.
- Reduce your carbon footprint with lower energy consumption.
- Help qualify for utility rebate programs to pay for system upgrades.

The stakes are high

Operational excellence is key to remaining competitive. Improving production rates, raising quality, and minimizing resource costs are the key drivers for competitive success. Your compressed air system impacts all three and presents a great opportunity for improvement in your plant.

Compressed air is likely your biggest energy user. Most compressed air systems operate inefficiently. Improper adjustments, leaks, artificial demand, and poor system design are all factors that contribute to unnecessarily high energy costs. Many of these same systems cannot deliver the desired air volume at the needed pressure. This results in lower production rates and quality, as well as higher life cycle costs. Our experience has shown that many facilities can achieve savings up to 50% by studying and optimizing their compressed air systems.

There are other important incentives to reduce energy consumption. From the consumers' perspective, the industrial "carbon footprint" is a growing concern, so environmental stewardship is a strategic issue. According to the latest estimates, optimizing existing industrial motor-driven systems (including compressors) could reduce global energy consumption by as much as 7 percent. If this is one of your strategic goals, examining your compressed air system will yield significant improvements.

Kaeser is a leader in making the most reliable and energy efficient compressed air products you can buy. Still, we recognize that having energy efficient components is only part of the efficiency picture and that the greatest efficiency gains are often achieved through system design. For many years, we've been helping customers do just that: design better compressed air systems that are dependable and energy efficient. We've led the way in promoting proper piping, storage, and controls, while others continue to focus merely on the initial capital cost of the equipment.

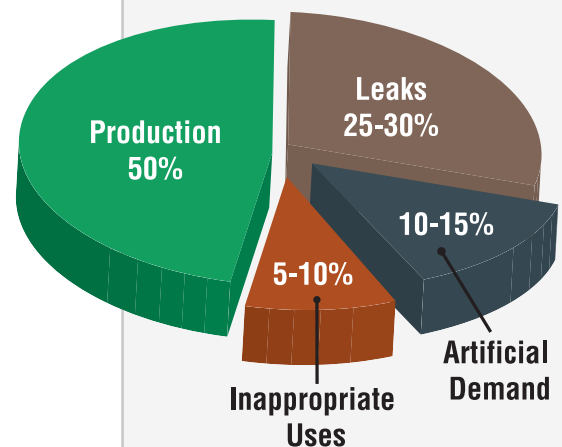
Whether your motivations are financial or environmental, an efficient air system will deliver the right amount of air at the lowest life cycle cost.

Department of Energy Findings

Compressors use as much as 10% of all electricity generated in the United States. The Department of Energy estimates that as much as half of all compressed air is wasted, with more than 25% lost through leaks (some air audit professionals have found overall leak rates as high as 50%). An additional 15 - 25% is wasted through artificial demand and inappropriate uses.

Power accounts for 70% of compressed air operating costs. When you consider that just one 125 hp compressor consumes approximately \$95,000 in electricity per year* it's clear how much you can gain by improving your compressed air system efficiency.

**Based on full-time operation at the US average cost for industrial electricity of \$.10/kWh.*



The ADA process

Kaeser credentials

- Our large System Design and Engineering staff includes Certified Energy Managers, CAGI Compressed Air System Specialists, and graduates of Compressed Air Challenge and AirMaster Plus training.
- We support the Compressed Air Challenge initiative to train industrial users in air system “best practices”.
- We were early advocates of the Compressed Air & Gas Institute’s initiative to develop a standardized compressor energy data sheet...and to encourage other manufacturers to accurately assess the power consumption of their equipment.
- We are ISO 9001:2015 and ISO 14001:2015 certified and are committed to continually improving our efficiency without compromising our quality.



Site survey and walk through

The first step in an Air Demand Analysis is to become familiar with your air system. Discussing your goals for the assessment, areas of concern, production needs, and air quality issues help lay the groundwork for a successful optimization project.

From there, we review all the components of your air system, including:

- Compressor controls
- Overall system controls
- Intermediate storage and distribution piping
- Air treatment equipment

We also investigate cycles and trends in plant processes to see how they relate to system dynamics and identify possible correlations with system performance issues. Using this information, we can baseline system performance more accurately and build a better system demand profile that takes into account dynamic production needs.

Your Kaeser field representative will visit your site to:

- Collect detailed information on your system components, environmental conditions, and physical layout.
- Collect appropriate supporting graphical data such as plant blueprints, schematic drawings, sketches, and photographs.
- Gather input on specific problems your plant is currently facing and discuss desired outcomes.

Comprehensive Analysis

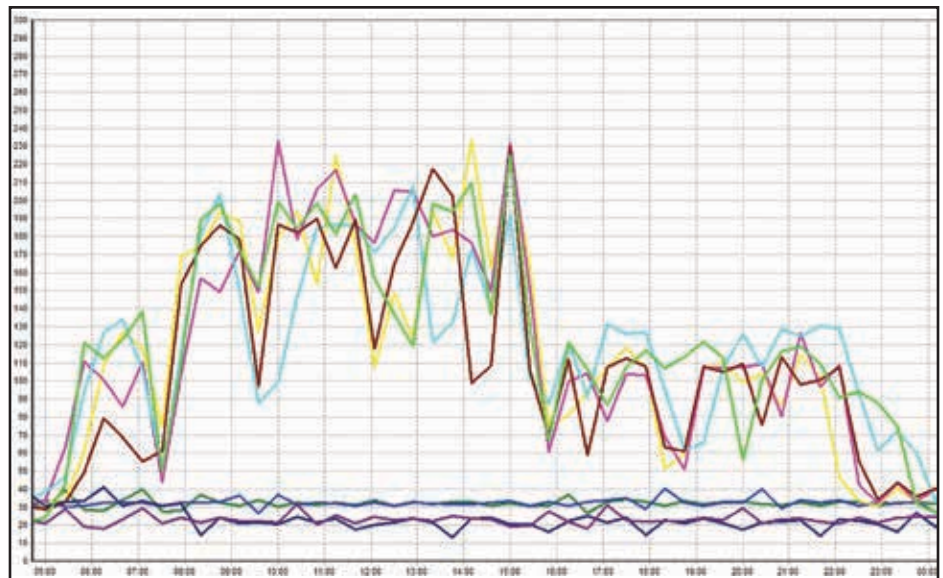
To obtain a detailed, accurate picture of your compressed air demand and system dynamics, we install a variety of instruments and sensors customized to your unique system. Key parameters measured are pressure, flow, and power consumption. Since you pay for kWh, we measure kilowatts—not amps—to give the most accurate cost calculation. Our approach creates a complete picture of system activity – including leaks, which are often most apparent during off-peak production periods.

Using our proprietary ADA software, we identify waste and poor practices, such as leaks or artificial demand caused by operating at unnecessarily high pressures. It also shows energy loss due to pressure drop in distribution piping.

This step also helps identify deficiencies in the air supply, storage, or piping along with any control issues.

Kaeser Energy Savings System

We use our powerful **Kaeser Energy Savings System** (KESS) software to simulate power requirements of different system scenarios. This helps identify solutions that will achieve the greatest efficiency without compromising pressure/flow requirements or system reliability.

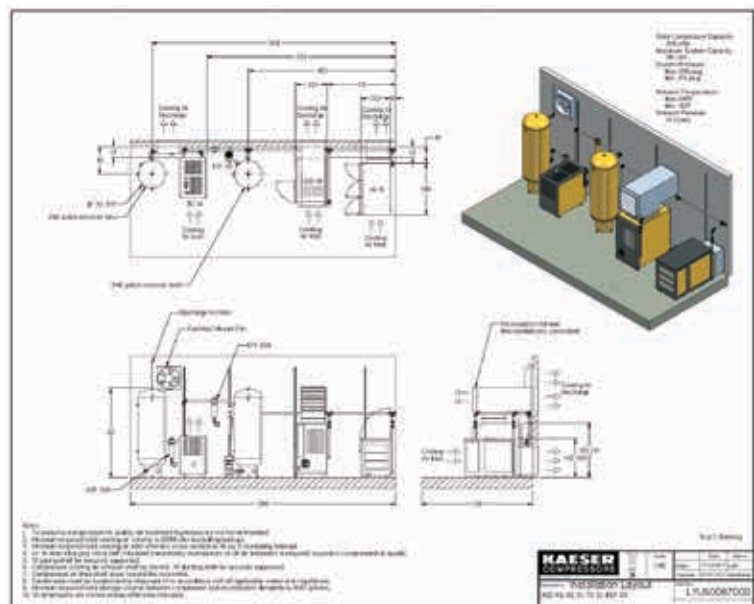


We create detailed time-stamped charts from the recorded data. These are used to analyze your system from several perspectives and offer insight into your operating activities and corresponding air requirements.

Analysis and Recommendations

Your Air Demand Analysis from Kaeser isn't complete until we issue our final analysis and recommendations. This includes a side-by-side comparison of multiple scenarios showing their purchase price, energy costs, and savings.

Recommendations often focus on making adjustments to controls, storage, or piping rather than buying new equipment. Armed with these ideas, you'll be able to determine the most cost-effective system changes.



If new equipment is warranted, we can provide detailed drawings for installation planning to ensure proper pipe sizing and storage as well as adequate ventilation.

Measurable results

Here are examples of recent ADAs we've conducted that delivered significant and immediate benefits to our customers:

- A precision metal fabricator was using two 40 hp modulating compressors to supply their flow, but struggling with pressure fluctuations. Our ADA revealed the system was oversized and a single 20 hp dual control compressor could handle the demand. This has reduced their energy costs by 40%—even though their average demand has increased by 28%.
- A music studio equipment manufacturer struggled with pressure, flow, and air quality problems. Our ADA recommended a system that would deliver steady pressure and flow and an energy efficient dryer to address the moisture problems for \$36,110 in annual energy savings.
- A plant manufacturing turbines for hydro-electric power plants reduced their system specific power from 62.0 kW/100 cfm down to 16.7 kW/100 cfm by switching from multiple modulating control compressors to energy efficient rotary screw compressors with a system master controller.
- A furniture manufacturer struggled with vacuum hold down. Our ADA identified flow—not vacuum—was the problem and designed a new system with vacuum blowers. This solution reduced the system horsepower by 200 hp and is saving them \$99,000 in energy and maintenance costs every year.
- At a metal products plant, our ADA identified \$51,000 in savings for fixing system leaks and \$17,000 in savings for adding proper system controls.
- Thanks to the recommendations from an ADA, a Tier I automotive parts supplier was able to reduce their power consumption by 865,440 kWh—the equivalent of removing 100 homes from the power grid for a year. The energy and maintenance savings totalled \$133,720. On top of that, they received a utility rebate of \$71,579.
- An automotive parts manufacturer with multiple, uncontrolled centrifugals was spending \$699,779 in energy costs and approximately \$109,000 on annual maintenance. Our ADA identified \$129,046 in energy savings—along with drastically reduced maintenance costs—for a 17-month simple payback period.
- A cement manufacturer conducted ADA's at five of their plants. Implementing the recommendations resulted in a 12,658 ton reduction in CO₂ and an average monthly savings amongst the plants as high as 64%.



Will your facility benefit from a Kaeser Air Demand Analysis?

| | Yes | No |
|--|--------------------------|--------------------------|
| • Have you calculated the energy costs associated with your air system? | <input type="checkbox"/> | <input type="checkbox"/> |
| • Do you have a pressure/flow/energy profile, so you know what is actually happening in your air system? | <input type="checkbox"/> | <input type="checkbox"/> |
| • Do you know what your air demand is? | <input type="checkbox"/> | <input type="checkbox"/> |
| • Have you ever measured pressure drop in your piping? | <input type="checkbox"/> | <input type="checkbox"/> |
| • Have you ever tested for leaks? | <input type="checkbox"/> | <input type="checkbox"/> |
| • Do you have secondary storage or controls separating air supply from distribution? | <input type="checkbox"/> | <input type="checkbox"/> |
| • Do you have a stable supply of air at the required pressure at all points of use? | <input type="checkbox"/> | <input type="checkbox"/> |
| • Have you eliminated high scrap rates or eliminated lower product quality caused by malfunctions in air-operated equipment? | <input type="checkbox"/> | <input type="checkbox"/> |
| • Has adding compressors to a low-pressure problem improved system performance? | <input type="checkbox"/> | <input type="checkbox"/> |
| • Have you contacted your local utility or energy service company to see if rebates or other incentives for energy reduction projects are offered? | <input type="checkbox"/> | <input type="checkbox"/> |
| • Do you know your system specific performance baseline in kW/100 cfm? | <input type="checkbox"/> | <input type="checkbox"/> |

If you answered “no” to any of these questions, it’s highly likely your operation will benefit from a Kaeser Air Demand Analysis.

Take the Next Step

To start realizing energy cost savings, lower maintenance/repair costs, and increased productivity through a more stable supply of compressed air, contact your local authorized Kaeser representative today about a Kaeser Air Demand Analysis.

Visit us.kaeser.com/ada for more information.

The world is our home

As one of the world's largest compressed air systems providers and compressor manufacturers, Kaeser Compressors is represented throughout the world by a comprehensive network of branches, subsidiary companies and factory trained partners.

With innovative products and services, Kaeser Compressors' experienced consultants and engineers help customers to enhance their competitive edge by working in close partnership to develop progressive system concepts that continuously push the boundaries of performance and compressed air efficiency. Every Kaeser customer benefits from the decades of knowledge and experience gained from hundreds of thousands of installations worldwide and over ten thousand formal compressed air system audits.

These advantages, coupled with Kaeser's worldwide service organization, ensure that our compressed air products and system deliver superior performance with maximum uptime.



KAESER
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Built for a lifetime.

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