White Paper

Gardner Denver

Total Cost of Ownership

CONSIDERATIONS FOR BLOWERS & COMPRESSORS

www.gardnerdenver.com/gdproducts

Look Beyond Price to Total Cost of Ownership

Purchasing a Compressor or Blower?

When buying that new car for your teenager it can be nervous time. Do you go new or used? What are the most important buying criteria – safety, reliability, gas mileage or low price? We will leave those tough decisions up to you.

When purchasing an air compressor or blower, we recommend you consider doing a Total Cost of Ownership (TCO) analysis and here's why.

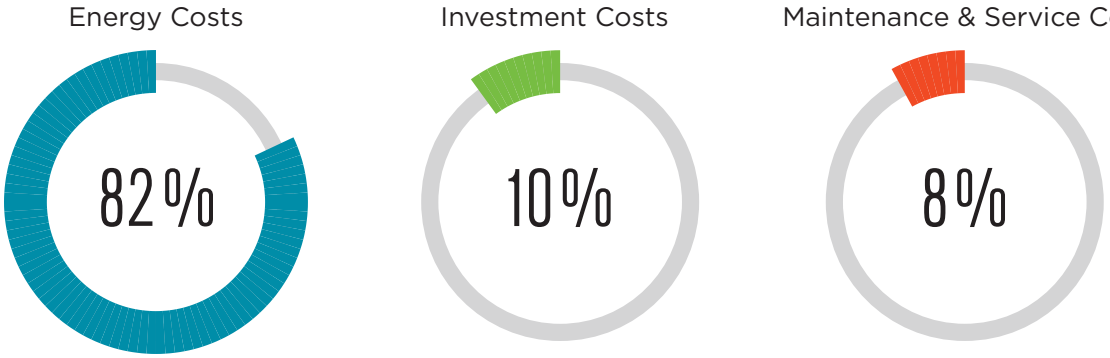
A TCO analysis is meant to uncover ALL (or most) of the lifetime costs associated with owning an asset such as a compressor or blower. Asset ownership involves purchase cost, of course, but ownership also brings costs due to installing, deploying, using, upgrading and maintaining these assets. Before purchasing, you should keep two important facts in mind when considering a TCO analysis:

1. After-purchase costs, such as energy, operation and maintenance requirements are significantly greater than the initial purchase cost after just a few years. (See total cost of ownership below).
2. There can be a large difference between technologies, brands of compressors and blowers when it comes to after-purchase costs over a 5–10 year period.

Given these facts, it makes sense to perform your TCO analysis by knowing not only the purchase price, but also other major life cycle costs such as maintenance costs and the electrical cost of operation for the asset. When completed, your TCO analysis will likely show a very large difference between purchase price and total life cycle costs, making your knowledge of the after-purchase costs the most important information you can have before you buy.

We will keep the TCO examples (Page 5) simple and look at just purchase price, maintenance costs and the electrical cost of operation for the assets considered. However, before we look at some simple examples, here are some important observations in each of these three cost areas.

TOTAL COST OF OWNERSHIP*



*Represents typical fixed speed compressor operating at 70% load

Initial Purchase Price

Even for compressors or blowers providing the same amount of air, purchase prices can vary by large amounts. For example, with 50 HP air compressors, it is not uncommon to see machines that vary in price by 40%. One big reason for this is that you can use a very small compressor airend (the part on the compressor package doing the compressing) and rotate it at a very high speed (5,000+ RPM) to keep compressor cost down or you can use a larger airend and turn it more slowly. This larger, slower-turning airend, with more material and greater machining requirements, is obviously more costly to produce. Although the compressor with the larger airend is likely to cost you significantly more up front, your TCO analysis will show you whether the efficiency improvement that comes with the larger airend pays for itself in energy savings in a short period of time.

For blowers, it is not uncommon to see machines that vary in price up to 15%. This could be because you can use different motor drive methods that help with energy savings over the life of the blower package. These newer technologies such as using a permanent magnet motor drive design is likely to cost you significantly more upfront. However, your TCO analysis will show you whether the efficiency improvement that comes with the permanent magnet motor pays for itself in energy savings in an acceptable timeframe.

With a TCO analysis, the numbers will tell you a more complete story.

Most customer surveys show that buyers place reliability, energy efficiency, serviceability and other benefits ahead of purchase price in the buying decision. By doing a numbers-based TCO analysis, you can put some quantitative elements behind the buying criteria that are important to making an informed decision.

Maintenance Costs

In doing a TCO analysis, it's not the objective to have individuals providing a quotation give you the lowest maintenance cost numbers possible in order to make his/her analysis look good. If providing maintenance numbers in a quote cuts corners, or leaves out necessary maintenance steps in order to keep the cost down, that proposal will cost you in dollars and downtime in the long-run. Properly timed maintenance, done with high-quality OEM parts, reduces operating costs, improves product quality and delivers manufacturing efficiency that is measurably better.

Thus, in a TCO analysis, make sure you are comparing maintenance costs on an apples-to-apples basis. If there are differences in required maintenance, make sure that any disparities are real and justified. In some instances, there are maintenance activities that if done more frequently, the result is a net savings when the cost of the maintenance is compared to the energy savings that can be derived from use of a newer, lower pressure drop part. The bottom line is that a robust maintenance program pays for itself. If you carefully evaluate the maintenance offerings put before you, you'll end up with a strong TCO analysis and be satisfied with the operating performance of your equipment and your plant.

FOR MAINTENANCE WORK, CONSIDER A SERVICE AGREEMENT WITH YOUR LOCAL DISTRIBUTOR.

For a compressor, a strong "air house" will take care of your regular maintenance with factory trained technicians and ensure that your system is delivering the reliability and efficiency that add thousands of dollars to your bottom line.

Energy Cost of Operation

Over a 5–10 year period, the electrical cost to operate a compressor or blower accounts for 70% or more of the total life cycle costs. This fact leads to the following observations:

1. If your cost of power is high, a more energy efficient compressor or blower will most often show up as the better choice in your TCO analysis.
2. For similarly sized compressors and blowers, there are large differences in efficiency levels (input power required per 100 CFM of air produced) between different technologies and brands.
3. Don't look at just the full-load efficiency of the asset. Air demand often fluctuates, so the air salesperson needs to show part-load efficiencies, where applicable, for the energy cost calculation to be accurate.
4. The efficiency performance numbers for members of the Compressed Air and Gas Institute's (CAGI) Third-party Performance Verification Program are confirmed by an independent third-party. Manufacturers that are not part of this program can publish unverified numbers for their compressors using test standards favorable to their reporting process.
5. Local Energy Rebate Programs will typically pay some portion of the purchase cost of an energy efficient compressor or blower. Make sure you are aware of available programs.

As you can see, energy cost can often be the most important expense to evaluate. "Going Green" and saving even 1 kilowatt for every 100 cubic feet per minute of air utilized can add up to big savings that drops right to your bottom line profitability.

Total Cost of Ownership Examples

BLOWER PACKAGES

Operating at 8.35 PSI & 927 CFM for 8000 operating hours, with an energy cost of $.09 Kwh

*Maintenance includes oil and air filter replacement
As this example shows, Blower B is less expensive to purchase. The key in this TCO example is the energy cost to operate the units. Blower A costs over $21,000 less to operate the unit over a 5-year period due to the efficient design of the screw blower being driven by the permanent magnet motor. The payback on this unit is just under three years and this equipment is designed for 20+ years of service so the energy savings will continue for many years to come.

	BLOWER A Screw Blower with 44 HP Permanent Magnet Motor	**BLOWER B** Lobe Blower with 52 HP Standard Motor	**DIFFERENCE**
Purchase Price	$38,500	$22,500	$16,000
Maintenance 5 Years	$1,500	$1,500	$0.00
Energy Cost 5 Years	$118,115	$139,575	($21,460)
Total Cost 5 Years	$158,115	$163,575	($5,460)

LUBRICATED ROTARY SCREW COMPRESSORS

50 HP compressors operating at 125 PSIG for 6,000 hours annually, with an energy cost of 0.09/kWh and a medium air demand profile

*Maintenance parts include the consumables: air filters, lubricant filters, air/oil separator elements and lubricant.

As this example shows, Compressor B is both less expensive to purchase and less expensive to service in terms of the consumable parts. However, the key in this TCO example is the energy cost to operate the units. Compressor A costs more than $10,000 less to power over a 5-year period due to its efficiency advantage. And since Compressor A is $160/month less to service and operate, it will pay back the higher initial cost in less than five months. (Compressor performances and energy cost calculation can be provided by your local air compressor distributor.)

	COMPRESSOR A	**COMPRESSOR B**	**DIFFERENCE**
Purchase Price	$20,950	$20,211	$739
Maintenance 5 Years	$7,865	$7,332	$533
Energy Cost 5 Years	$75,990	$86,495	($10,505)
Total Cost 5 Years	$104,805	$114,038	($9,233)

OIL-FREE COMPRESSORS

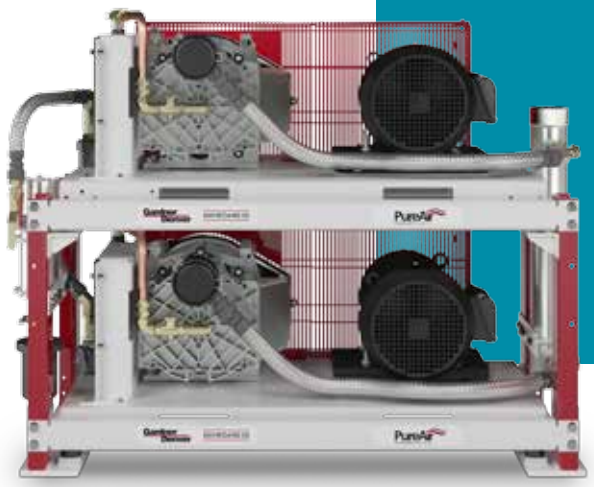
300 HP compressors operating at 125 PSIG, a constant air demand of 1,400 CFM for 6,000 hours per year with an energy cost of 0.09/kWh

*Parts cost assumes basic service kits, cooler kits, and lubricant. No air end or impellers were included.

Similarly, in this example, the more efficient compressor (A) has a lower TCO by $25,000 after five years. With lower service and energy cost, Compressor A will pay back the $15,000 higher price in just under two years. The important thing is that with the numbers in front of you, you can make the best informed decision for your business.

	COMPRESSOR A	**COMPRESSOR B**	**DIFFERENCE**
Purchase Price	$230,000	$215,000	$15,000
Maintenance 5 Years	$26,000	$30,000	($4,000)
Energy Cost 5 Years	$691,000	$727,000	($36,000)
Total Cost 5 Years	$947,000	$927,000	($25,000)

The Maintenance Aspect of Total Cost of Ownership



Maintenance Best Practices

"In many cases, it makes sense from **efficiency and economic** standpoints to maintain equipment more frequently than the intervals recommended by manufacturers, which are primarily designed to protect equipment."

— Compressed Air Challenge

Compressor Package Maintenance: Air/Lubricant Separator

"The increased pressure drop (over time as the separator gets dirtier) causes an increase in compressor airend discharge pressure, with a resulting increase in power. If electricity prices are high, replacing the separator before the pressure drop reaches 10 PSI will reduce energy costs."

— Compressed Air Challenge

Summary of TCO Analysis

IN SUMMARY, TOTAL COST OF OWNERSHIP ANALYSIS IS TYPICALLY AN EYE-OPENING EXPERIENCE.

While it will deliver numbers helpful to the decision making process, you are also bound to uncover a variety of other helpful issues and opportunities as a result of undertaking the exercise.

ENJOY THE JOURNEY!

About Gardner Denver Industrials Group

Gardner Denver Industrials Group delivers the broadest range of compressors and vacuum products, in a wide array of technologies, to end-user and OEM customers worldwide in the industries we serve.

We provide reliable and energy-efficient equipment that is put to work in a multitude of manufacturing and process applications.

Products ranging from versatile low- to high-pressure compressors to customized blowers and vacuum pumps serve industries including general manufacturing, automotive, and waste water treatment, as well as food & beverage, plastics, and power generation.

Our global offering also includes a comprehensive suite of aftermarket services to complement our products. Gardner Denver Industrials Group, part of Gardner Denver Inc., is headquartered in Milwaukee, Wisconsin, USA. Gardner Denver was founded in 1859 and today has approximately 7,000 employees in more than 30 countries.

For further information please visit www.gardnerdenver.com/gdproducts

Disclaimer:

WP-GD-TCO 10/17

Gardner Denver