

# Vacuum Audit: A Way to save money and energy



## Improve the efficiency of your vacuum system!

For a wide range of processes, providing vacuum is an essential requirement. However, producing vacuum is always a complex and cost-intensive process. The cost of energy used by a vacuum plant over its lifetime exceeds its purchase price many times over. This means that working at the optimum settings of a vacuum system is one of the most important economic factors in plant operation. In many cases, process parameters are carefully set during start-up, after which the settings are rarely ever modified. However, if left untouched over long periods, the availability and efficiency of a system will decrease and operating costs will inevitably increase.

## How we can help? The vacuum audit by Nash

Gardner Denver Nash has over 100 years of experience with vacuum and compressor systems. We have an eye for the plant as a whole and an expert understanding of the finer points of machines and processes. Our comprehensive service package can optimize your vacuum and/or compressor system and support you with energy saving measures.

### Definition of the relevant parameters

Like all complex systems, when it comes to the creation of vacuum there are many mutually interactive variables to be taken into consideration. Backed by our wealth of experience, we focus on precisely those issues which determine the efficiency of a vacuum system, such as:

- Age of the liquid ring pumps
- Operation speed
- Loss of suction capacity and efficiency with increased operating time
- Functionality of system valves
- Seal water parameters (quality, quantity, temperature)
- Functionality of pre-separators and extraction pumps
- Pump assignment and pump arrangement
- Current system requirements  
(e.g. following plant modification)

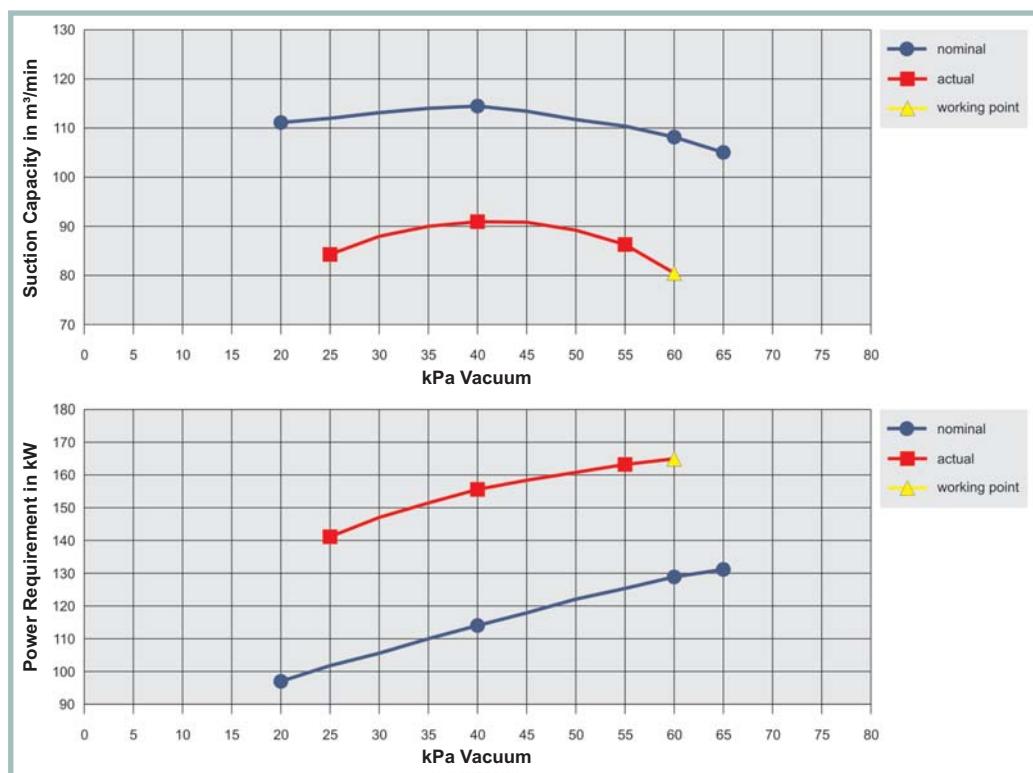
### Analysis of the current situation

Using our state-of-the-art equipment, we will determine what parameters are affecting the energy consumption and the efficiency of your plant. We will check the shaft speed of the pump, calculate its electricity consumption and establish its suction and flow rates at predefined measuring points. Visual inspections of the pump, both internal and external, complete the process of assembling data.

### Performing the measurements

During scheduled downtime, the inlet compensators are dismantled and calibrated and precision orifice plates are mounted. The pumps are started and measurements are taken three times, using different plates each time.

To produce a performance curve, at least three measurement points are determined. Using software, the diagrams "Volume flow/vacuum ( $m^3/min / kPa$ )" and "Output requirements/vacuum ( $kW / kPa$ )" are produced.



As a general rule,  
the test takes around  
one hour per pump.

## Evaluation of data

The difference between the nominal value ("nominal") and the actual value ("actual") produces deviations in terms of current volume and output. These deviations, " $\Delta \text{ m}^3/\text{min}$ " and " $\Delta \text{ kW}$ ", provide the base value for determining the Return on Investment (ROI). The estimated repair or upgrade costs are additionally determined. Based on these values, the ROI for the suggested improvement measures is calculated.

## Presentation of results

The results of our tests, combined with our comprehensive know-how, enable us to determine which settings should be adjusted to optimize your vacuum or compressor system, even in complex processes. We will draw up a detailed test report for you, including the records and test data we have compiled. Our proposals for optimizing your system and incorporating energy saving measures will be based on this information.



## An economical solution

Optimizing your vacuum system will result in significant energy reductions and will, therefore, save you money.

We have already successfully analyzed a large number of pumps and vacuum plants. In cases where our final suggestions were implemented, the ROI has generally been less than 12 months!

Ask our experienced experts to carry out a vacuum audit of your plant! The highly qualified Nash service engineers will analyze your plant on site and present a schedule of suggested solutions for energy saving and plant optimization.

**Do you have questions?  
Please contact your NASH Service Partner!**



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Gardner Denver Nash has an extensive network of sales offices and representatives all over the world.

Gardner Denver Nash has many ISO 9001 and ISO 14001 certifications.



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