WHITE PAPER

# THE COST OF COMPRESSED AIR

**Discerning Fact from Fiction** 





## PART 1

### It is estimated that up to 50% of all compressed air generated for the manufacturing floor is lost to leaks, artificial demand, and inappropriate use<sup>(1)</sup>. Facilities rely on compressed air for production, yet it is expensive to produce and even more costly to lose.

Controlling your compressed air supply is essential to maintaining a functional and reliable system. This typically includes comprehensive waste management through monitoring and repairing leaks, incorporating pressure stability systems, and minimizing air loss during condensate draining.

Reducing operational downtime, enhancing reliability, and taking environmentally responsible measures will help to improve the bottom line. This paper is the first of a three-part series. This first installment addresses the comprehensive cost of compressed air. The second installment of the series will address the importance of proper drain selection. The third and final installment will cover the safe and effective management of system condensate.

### A Complete Compressed Air System

Lost air is a significant source of wasted energy in a compressed air system and can account for as much as 20% to 30% of the compressor's output. A comprehensive preventative maintenance program and an inclusion troubleshooting plan are necessary to operate an efficient system. Maintenance or repair costs can appear too costly and not worth the effort and expense therefore, it is too common for facilities to use inefficient systems.

#### **Compressor Control Strategy**

Facility operators must recognize that it is essential to have a well-designed compressor control strategy to maintain the system and optimize profits. An average-sized facility that does not incorporate a maintenance strategy will typically lose an equivalent of 20% to 30% of the total compressed air production capacity. Compressed air leaks, vent lines, and open drains contribute to systematic problems, including:

- Fluctuating system pressure causing air tools and other air-operated equipment to function less efficiently.
- Excess compressor capacity increases operating costs.
- Decreased service life increases labor, repair, and replacement costs.
- Increased maintenance of equipment due to fluid buildup.
- Loss of production time.

The success of your compressor management strategy is directly related to the implementation and follow through on problems. When an open line or leak has been identified, ensuring there are steps taken to repair the problem sounds like common sense, yet too often, a facility will identify the source of wasted energy and dollars and fail to repair the breakdown.



A typical compressed air system consists of a compressor, dryers, drains, filters, receiver tanks, and oil & water separators.



### Fact vs Fiction The Cost of Lost Air

FICTION: Compressed air doesn't cost your facility anything – air is free! FACT: On average, for every 10 CFM of air produced, approximately 1.5KW of electricity is required. Compressed air is one of, if not the most expensive utilities\*.

FICTION: Compressed air leaks are a small cost of doing business. FACT: Compressed air leaks are a significant source of wasted energy and increased manufacturing and/or production costs. When leaks are left unattended, losses of compressed air average 20-40% of system capacity.

**FICTION:** Repairing air leaks cost more than its worth.

**FACT:** Compressed air is expensive. A single small leak or vent line cost \$2-3 per day, every day of operation - that adds up to more than \$500 a year for 5 days of weekly operation...per leak!

FICTION: Electricity is the only cost to consider with wasted air. FACT: The total cost of ownership (TCO) must be considered when evaluating the cost of wasted air. Maintenance and labor costs will be increased with all components of the compressed air system operating beyond the normal duty.

\*Refer to 'A Closer Look' on page 8.

### QUESTIONS FOR MAINTENANCE & OPERATIONS MANAGERS

- 1. Does your facility have a preventative maintenance program for your compressed air system?
- 2. Does your preventative maintenance program include ancillary components, such as dryers, filters, drains and oil-water separators?
- 3. Is your compressed air system properly sized for your needs?
- 4. Is there a rebate program available with your utility provider for installing energy-saving, zeroloss demand style condensate drains?
- 5. Does your local waste water treatment district have a fine program for excess fats, oils and grease (FOG) discharges?

### Actively Managing Air Loss

Controlling air loss is essential to containing the costs of leaks, vent lines and open drains. Under-managed systems also negatively impact the environment and the health and safety of employees. The financial stability of a facility depends on systems that are well maintained – wasted air is expensive and it can be prevented.

Oftentimes, operators of smaller-sized facilities mistakenly believe that preventative maintenance may not benefit them. Yet, due to the inherent value of compressed air, repairs that are implemented promptly will save money regardless of size.

#### **A Complete System**

Compressed air systems produce a supply of clean, dry air for most applications and condensate drains are essential components. Condensate drains automatically discharge condensed water and contaminants from the separators, receiver vessels, and compressors. Maintaining condensate drains is important to avoid condensate and other contaminants that could result in production down time from harming the systems. Because leaks are not always visually apparent, regular testing must be conducted to ensure a functioning system.

#### **System Audits**

An effective cost-containment program must include annual or bi-annual system audits. Maintaining a system's functionality comes at a cost. Every facility manager needs to have a full comprehension of how cost-containment expenses compares to the money saved over time. Systems that are regularly maintained to control leaks and open drains often require fewer compressors.

### Conclusion

#### **Thinking Beyond Dollars & Cents**

Compressed air is a pricey commodity. Every manufacturing facility must anticipate problems and prepare for the reality of lost air. Implementing and actively managing loss and condensate is the key to maintaining efficient systems. Costs cannot be minimized if there are inefficiencies in the equipment.

Compressed air waste can have a negative impact on the health and safety of employees and cause damage to sophisticated equipment. And, environmentally responsible organizations understand the importance of containing condensate. Successful facility managers and staff must investigate their systems and become experts in the drains and oil water separators they rely on.

### Loss of Production Time and Labor is Costly

A tried and true saying states, 'good quality never costs more.' Similarly, instituting a comprehensive maintenance program will result in comprehensive savings. Thinking beyond the expense of a maintenance program will result in savings such as:

- Actively managing condensate equates to dollar savings.
- Zero loss drains are energy efficient and often pay for themselves in less than a year.
- Controlling leaks and waste can permit right-sizing of the compressed air system and possibly reduce the number of compressors required.
- Many utility companies offer rebate programs for facilities that use zero loss drains. Because zero loss drains control wasted air, some utility companies even share the installation costs.

When it comes to the cost of lost air, repairing leaks is not enough. Active condensate management plays a significant role in productivity and profitability for every size facility. When a facility staff can quantify the costs of their systems and determine an accurate budget, including the return on investment, productivity and profitability will increase.



### A CLOSER LOOK INTO THE COST OF AIR LOSS

Facilities that use compressed air rely on it every day. For example, automotive spray painters use compressed air in sealed paint rooms. A typical 3/4" impact wrench will use 9 CFM (25% utilization) at 90 psi. If you operate 3,200 hrs (2 shifts x 200 days/year x 8 hr/shift), and your power costs \$.09/ KwH, the cost of compressed air related to that single impact wrench is approximately \$380 annually. The cost can increase exponentially as you add more air tools into this example. However, if there is a leak in the line, the cost will be higher.

Unlike the impact wrench where the air flow is controlled, a 1/8" leak in a line will waste thousands of cubic feet of compressed air. It is estimated that a 1/8" leak, running 24/7, can cost a facility more than \$4,000 annually.

There are other considerations to ensure that a facility is not wasting money on air leaks. If moisture or other condensate is present in the air, the paint will have defects. When this happens, the costs of correcting the defects will add up. Routine maintenance and proper product selection is the more cost-effective option. Furthermore, condensate can accumulate and reduce the storage capacity necessary to ensure uninterrupted production.

Condensate drains are a key component in the removal of moisture, lubricants and other contaminants that affect the quality of compressed air. Proper drain sizing and selection helps operators minimize the loss of compressed air. We will address this in Part 2 of these series.

### FOR MORE INFORMATION

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### About the Author

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With more than 30 years of industrial experience, Bill has managed processes on individual and group levels to improve and optimize operations, including implementing engineering processes and enhancing revenue streams. Currently, he is responsible for overseeing operations at ASP, a company recognized as the best in condensate management. ASP is an integral part of Filtration Group, the world's fastest growing filtration organization. Bill holds a BSChE and an MBA from the University at Buffalo and is a senior member of ASQ.

### About ASP

Air System Products (ASP) is a leading designer and manufacturer of condensate management products, including condensate drains and oil-water separators for the air and gas compressor market. Since 1981, ASP has developed efficient, reliable, and cost-effective products and systems for industries that use compressed air. ASP products exceed stringent environmental regulations that apply to condensate for a global customer base. ASP's innovation, condensate management, and service are regarded to be the best in the industry.

(1) The United States Department of Energy https://www.energy.gov/



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