

## MAINTENANCE STRATEGIES FOR **BLOWERS**

Best practice for reducing downtime in the wastewater treatment industry.



**WHITEPAPER**

# INTRODUCTION

**Blower equipment plays a crucial role in the wastewater treatment industry, providing air or oxygen to the biological treatment process. Typically used in aeration systems, the efficient operation of blowers is critical to ensure reliable operation and high performance, particularly where the rising cost of energy is a concern.**

Wastewater treatment plants are subject to stringent regulations regarding air quality, treatment efficiency, and environmental impact and will therefore invest heavily in blower systems to help maintain this performance. However, this is dependent on the appropriate – and regular – maintenance of the blower system, helping to ensure operators can meet the required standards and avoid the heavy penalties associated with poor site performance.

In our previous whitepapers, we have explored the importance of good blower design, considering the site conditions and environmental impacts to help maintain the required system performance.

Here, we will examine the importance of maintenance to ensure maximum efficiency and to help lower costs. Selecting blower equipment

## 1. Optimum performance



## 2. Longevity



Clean and well-maintained blowers can provide the required air or oxygen more efficiently, leading to better treatment outcomes.

Scheduled maintenance and inspections help identify potential issues before they escalate into significant problems, reducing the risk of unexpected breakdowns.

## 3. Energy efficiency



## 4. Noise reduction



Well-maintained blowers are more energy-efficient, as they require less power to deliver the required airflow or oxygenation.

Routine maintenance can help identify and rectify noise-related issues, such as worn-out bearings or misaligned components.

## AT A GLANCE - THE FIVE BENEFITS OF EFFECTIVE MAINTENANCE

## 5. Safety



Well-maintained blowers can help reduce safety risks, such as overheating, excessive vibration, or leaks.

# FOLLOW THE RULES

that is criteria to maintain should be a key criterion at the specification stage, and this guide will focus on the following key outcomes that can be achieved by implementing a thorough maintenance regime.

- Minimising unexpected costs
- Avoiding equipment breakdown and ensuring maximum plant operating efficiency
- Helping to reduce the financial risk and reputational consequence of pollution and the associated fines

We will focus on the following blower types:



Positive displacement rotary lobe blowers



Screw blowers



High-speed turbo blowers, with centrifugal compression

**Low pressure blowers are a critical component in the aeration system for a wastewater treatment plant. Their performance is not only dependent on the quality of the original equipment design. It is just as important that the initial installation is considered carefully alongside the ongoing maintenance regime.**

Supplying the large volumes of air required into the tanks is an energy-intensive process – in some instances, as high as 70 per cent of the site's total energy consumption. Prioritising blower system maintenance is therefore a key consideration where rising energy costs are a concern.

Site personnel should consult the user manual regularly and adhere to the best practice guidance provided, covering areas such as the professional installation of the blower, safety information and precautions, operation and maintenance to name a few.

## FAST FACT

Robuschi has comprehensive user manuals for all blower technologies. Please refer to your specific manual for detailed product installation, maintenance and safety instructions.

Area	Checks	Impact on performance
Pre-installation	Check the condition of all blowers, compressor and ancillary parts and handle carefully.	Damage to sensitive components may not be immediately obvious, but it could impact on efficient performance over time.
Handling	Invest in an adapted lifting device for blower maintenance.	Effective maintenance cannot be achieved if the necessary tools are missing, especially adapting lifting devices for the blower being used.
Installation site	Install in a well-ventilated area, with sufficient maintenance space and away from sources of pollution.	If the blower is installed in a dusty environment, the suction filter would need to be replaced often. If the blower is installed in high humidity, it can cause electronic components to malfunction unless the proper precautions are taken.
Electrical connection	Electrical wiring must be carried out by a qualified electrician, and the ground connection facilities must be installed before plugging in.	Check if the specifications of the power supply correspond to the specifications on the blower rating plate. The supply voltage should be within 35 per cent of the specification specified on the blower rating plate, and the voltage difference between each phase should be within 2 per cent.
Controller configuration	Ensure the controller has been configured specifically for the application.	Setting incorrect control related parameters can cause significant damage. Therefore, only trained and qualified personnel should be allowed to set the parameters.
Routine inspection	A schedule of daily or weekly inspections should be created, covering the correct working of the cooling fan, vibration strength, filter condition, noise level and control data.	This will help ensure the blower operates smoothly and will extend the lifecycle of parts and components.

# UNIQUE SITE CONDITIONS

**The blower equipment user instructions will be based on standard conditions and may not consider the specific working environment for each wastewater treatment plant.**

It is important to factor the wide range of different site conditions into any considerations around equipment maintenance, with the following as examples:

Factor to be considered	Impact on maintenance	Areas to consider
 Ambient temperature	Temperature affects power consumption and efficiency.	High temperature can shorten the recommended maintenance intervals for the rubber components and oil changes. More frequent service checks are recommended.
 Operating hours	Low running hours can affect performance.	If a blower is not running for several weeks, seals can become damaged and corrosion can appear on any cast iron parts.
 Turndown	Start and stop limitations.	Different blower types will have variations in stop/start limitations. In particular, where a frequency converter is used, it is important to consider the acceleration ramp and the speed at which the machine reaches its maximum level, to avoid damaging the motor.
 Pressure variations	Diffusers will contribute to pressure increase.	Above a certain recommended pressure (which is dependent on the technology, size of airend etc), the maintenance frequency will need to be reduced to minimise the impact of increased pressure on the internal components. However, the diffusers will still require maintenance and should be checked regularly.

## FAST FACT

Each Robuschi blower features a QR code, providing instant access to spare part and user information.

# A STRATEGIC APPROACH TO MAINTENANCE

**Taking a strategic approach to blower maintenance can help businesses in the wastewater treatment industry lower costs, improve energy performance and reduce downtime.**

Investing in a full-service maintenance contract with a proven and trusted supplier will ensure regular maintenance and servicing is carried out to the highest standards.

A regular service schedule is also key, outlining when operators need to make critical checks and replacements to parts to keep the installation running at peak efficiency levels. These may be based round running hours or usage and will cover a broad spectrum of equipment parameters and components, from the controller functionality to oil levels, filters and the motor.

## MAINTENANCE AND INSPECTION PLAN FOR LOBE BLOWERS

CALENDAR MONTHS	Commissioning/ Start-Up	Weekly	Only after 1st 500hr op.	Every 1,000 hrs or 6 weeks	Every 2,000 hrs or 3 months	Every 4,000 hrs or 6 months	Every 8,000 hrs or 12 months	Every 16,000 hrs or 24 months	Location/ Position
<b>TASK REQUIRED</b>	0						6	12	24
First oil fill									DIA.1
Drain first fill @500Hrs & Replace oil									DIA.1
Oil change									DIA.1
Check air filter									3
Oil leaks & Level check									1
Belt tension & Alignment									10
Belt wear									10
Belt replacement									10
Replace air filter element									3
Inspect check valve									6
Relief valve									5



# SOPHISTICATED CONTROL

## MAINTENANCE AND INSPECTION PLAN FOR SCREW BLOWERS (F.L.)

CALENDAR MONTHS	Commissioning/Start-Up	Weekly	Only after 1st 500hr op.	Every 1,000 hrs or 3 months	Every 2,000 hrs or 6 months	Every 4,000 hrs or 6 months	Every 8,000 hrs or 12 months	Location/Position
<b>TASK REQUIRED</b>	<b>0</b>					<b>6</b>	<b>12</b>	
First oil fill								20
Replace Spin-on oil filter @ 500 Hrs op								20
Oil change								20
Spin-on oil filter								13
SPX Filter element								14
Check air filter								3
Oil Leaks & Level Check	👁	👁						1
Belt tension & alignment	👁							10
Belt wear								10
Belt replacement								10
Replace air filter element								3
Inspect check valve	👁							6
Relief valve	👁							5
Ventilation slot cleaning								11
Heat exchanger/oil cooler cleaning (if fitted)								19

## EVERY PART PLAYS ITS PART

Non-genuine spare parts and lubricants are typically cheaper than a manufacturer's original parts and, when decision makers are trying to cut down on costs, it can be tempting to opt for these.

It is widely accepted that using non-genuine alternatives can be detrimental to the system's overall performance. Furthermore, by replacing parts such as filters, valves, seals, and oil with a non-genuine alternative, there is no guarantee that the manufacturer's warranty will be upheld.

Genuine parts will have been manufactured to meet the same standards as the blower that they are intended for. They will have passed the manufacturer's stringent testing standards, in a quality-controlled environment, to help make sure a system continues to operate reliably.

The same is true of genuine lubricants; these are formulated with additives to help improve

performance and optimised to work with all the system's component parts. This ensures the correct lubrication, cooling and anti-wear qualities are maintained. Non-genuine lubricants can potentially place extra demands on the filter element, resulting in dust and other particles coming into contact with internal components.

### Robox Lobe Parts Care Programme

Our Robox Lobe Parts Care Programme provides OEM parts with three years' free extended warranty cover. It is simple to join and provides factory-approved, parts, helping avoid the pitfalls of non-genuine components that could cause irreparable equipment damage.

The scheme includes maintenance kits with alerts to help operators carry out routine service checks, including the 500 hour oil change and oil and filter change intervals.

**The rigours of the WWT industry mean that blower systems must be able to work continuously to satisfy the high level of demand. Regular maintenance cycles are required to maintain both product quality and machine performance.**

Proactive maintenance, also referred to as predictive maintenance, intervenes at an earlier point in the process and in many cases prevents a fault, which can often be traced back to insufficient maintenance or incorrect use. Predictive maintenance models based on real-time data can be established to help reduce energy consumption, improve process efficiencies, and limit any risks.

Data insights also allow operators to stay in control of their blower installation. The system provides historic, real-time, predictive, and cognitive analytics, so users can rectify potential issues before they arise.

At the same time, sensors are becoming cheaper and more powerful. This means operators can equip their system with numerous touchpoints to set up comprehensive real-time analysis.

This data can then be analysed, and the service technician can draw valuable conclusions, such as when the next maintenance interval is due. This can help to significantly increase functional reliability and productivity and the savings made can pay for the initial investment in a very short time frame.

Blower technologies are available with a range of control options, ranging from proprietary micro-controller to PLC-based controls. Most plants will have a master control system to maintain airflow or meet dissolved oxygen demand and it is important that operators understand and follow the controls' function for panel operation.





## TOTAL COST OF OWNERSHIP

**The maintenance of the blower system is a critical component in the overall cost of ownership, with service accounting for a significant proportion of the unit's total lifetime costs.**

**Operators will therefore be keen to minimise maintenance costs by avoiding any unnecessary repair bills – instead focusing on planned, preventative service checks.**

**Some of the common pain points for customers when considering the maintenance provision they have in place for blowers are:**

### Pain point 1

#### AVOIDING THE COST OF FAILURE

Unforeseen repair work, due to equipment failure can be a significant financial burden. The cost of hiring a replacement machine, while remedial work is undertaken, can be as much as 20 per cent of the purchase price of a new blower – and that is before the transportation, lifting and installation costs for a hire unit are factored in.

In addition, where a machine has been incorrectly maintained and a repair proves impossible, further costs will be incurred for the purchase of new blower equipment – with costs far exceeding the investment that could have been made in an ongoing service agreement.

Wastewater industry operators will therefore be keen to avoid these avoidable costs by considering a robust and comprehensive maintenance regime, to protect their blower investment.

### Pain point 2

#### REDUCING THE ECONOMIC CONSEQUENCES OF DOWNTIME

Wastewater treatment plants have to provide assurances to local authorities and municipalities that their process is fit for purpose. Any component of this process, such as an incorrectly-performing blower, which could result in contaminated water pollution has to be avoided.

This is not only to reduce the associated costs of this type of downtime, such as using a replacement machine for a period of time. Maintaining water quality at the outlet point is also an absolute must – so add to this the potential for water authority fines in cases where equipment failure has led to pollution of the water course, and customers can be faced with significant costs. In the UK for example, during 2022, 56 prosecutions were made, resulting in fines of 164 million Euros.

### Pain point 3

#### ENSURING ENERGY EFFICIENCY

Operators in the wastewater treatment industry are now subject to stringent government and legislative requirements to reduce energy consumption. Thorough maintenance regimes can help to keep blower equipment running at peak performance, having a positive impact on the site's overall energy reduction measures.

### 3

# BLOWERS IN ACTION

## PREVENTATIVE APPROACH

The Robuschi Service Team has been working for many years with municipalities in the wastewater treatment sector in Northern Italy, delivering a range of preventative and predictive maintenance options that deliver:

- **A reduction in plant downtime for increased productivity**
- **A reduction in emergency repair and the associated costs**

Maintenance contracts generally include one annual scheduled maintenance visit and a series of additional maintenance operations, for those units that require attention, such as blower unit overhauls or component replacement due to wear or failure.

Typical maintenance involves the replacement of key components, such as filters, oil and belts, but it is an essential part of the unit's reliable operation. Thanks to these checks, the Robuschi engineers can ascertain whether certain components are deviating from normal operation and take preventative measures to ensure equipment longevity.

One of the key service checks that provides insight into the machine condition is vibration analysis accompanied by temperature measurement.

In summary, the benefits of investing in these routine maintenance regimes are:

- **Replacement of components with original parts, specially designed for the application**
- **Extended machine/unit life.**
- **Reduction in the risk of unscheduled shutdowns, also with the help of 'forklift' machines that ROBUSCHI can supply.**
- **Industry experience from a trusted team**



## MULTI-SITE COST SAVINGS

For a leading service provider in the French water sector, the Robuschi team provides a multi-site maintenance contract for the company's four locations across France.

The harsh site conditions coupled with a lack of dedicated maintenance had led to some blower equipment failure. The Robuschi team proposed a comprehensive service contract, comprising one or two visits a year, dependent on each site's operating hours and conditions. The contract has been in place for four years and has improved equipment reliability considerably - delivering cost savings of up to 30,000 Euros per annum.



# THE ROBOX RANGE

## TOTAL BLOWER CAPACITY

Robuschi's new **Total Blower Capability** concept is a comprehensive package of cutting-edge blower solutions that includes rotary lobe and screw technologies, efficient high-speed turbo, and multistage centrifugal blowers, including side channel blowers.

**Range up to 2,500 mbar(g)  
and Flow up to 70,000 m<sup>3</sup>/h**



## ABOUT ROBUSCHI

**Robuschi has been a leading partner for the wastewater industry for many decades. Its wide product portfolio, such as blowers and pumps, offers energy efficient and sustainable solutions for a variety of applications in this field.**

Ecological sustainability is part of the Robuschi strategy, focusing on promoting environmentally friendly solutions, enhancing energy saving and protecting natural resources. We lead the market in developing innovative technologies that support our customers:

- Top energy efficiency
- Low lifecycle costs
- Low noise
- Water 4.0
- Ease of maintenance
- Compact
- Tailor-made offers

Ingersoll Rand water and wastewater treatment solutions offers a broad range of services to help lower cost of ownership and improve blower performance. We work with operators to increase output, improve sustainability and environmental performance and cut costs, backed by our professional service and support.



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[www.robuschi.com](http://www.robuschi.com)