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

Lobe technology is blown away by Atlas Copco's innovative aeration technologies



**Atlas Copco has an energy-saving blower technology to meet any demand**



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*Sustainable Productivity*



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All around the world, companies rely on our expertise and innovations to help grow their businesses. They count on us to cut their costs without cutting their productivity. We help them invigorate their production processes in a way that doesn't drain the life from our environment. We supply solutions that are adapted to specific circumstances all around the world. We take our responsibilities seriously: toward our customers, toward their future, and toward the future of our world.

**We are Atlas Copco. And we energize business!**



Climate change is one of the most serious environmental threats facing our planet. The **Kyoto protocol** sets the standard around the world, which means that countries and industries today face stringent targets to reduce carbon dioxide emissions. Commercial and legislative pressures to preserve the environment are driving industry to strive for energy efficiency. By achieving these targets, companies not only enhance their own **green credentials**, but they also improve their bottom line by **reducing energy costs**.

## Energy efficiency is key for saving our planet

### Wastewater treatment facilities consume large amounts of energy

According to the United States Environmental Protection Agency (EPA), "...approximately 56 billion kilowatt hours (kWh) is used for drinking water and wastewater services. Assuming an average mix of energy sources in the country, this equates to adding almost 45 million tons of greenhouse gases to the atmosphere. Just 10 percent of energy savings in this sector could collectively save about \$400 million annually."<sup>(1)</sup>

<sup>(1)</sup> U.S. Environmental Protection Agency, "Energy and Water/Wastewater Infrastructure", <http://www.epa.gov/region1/eco/energy/ew-infrastructure.html> (accessed February 2010)



### Blower systems consume up to 70% of total energy in wastewater plants

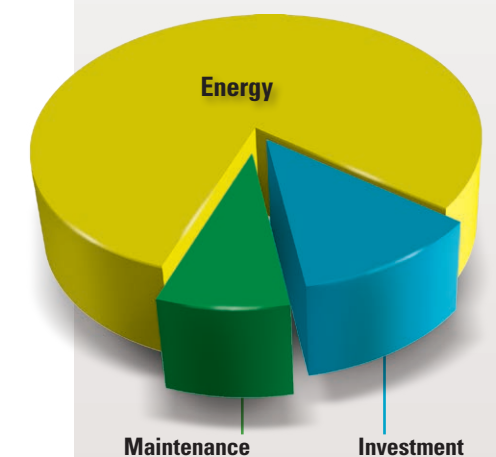
In a typical biological wastewater treatment plant, the aeration blower system accounts for up to 70 percent of the energy usage. Today the majority of these plants use less efficient lobe blowers, a technology that has had little development since its introduction in the late 19th century. By reducing the energy usage of their aeration blower system, these plants will decrease their energy costs while operating in a more environmentally friendly manner.



Energy represents the major cost in the lifecycle of your blowers

As energy consumption typically represents the majority of an air blower's life cycle cost, better energy efficient air blowers will have a significant impact towards preserving not only the environment but also your bottom line.

Total cost of ownership





# Milestones in energy efficiency

Atlas Copco's continuous drive for energy efficiency to reduce your energy cost, has made innovation the heart of Atlas Copco's values and for a century now, we have been at the forefront of compression technology thanks to a number of groundbreaking introductions. Over the past decades we have developed the highly efficient and economical screw technology, which complies with the requirements of standard ISO 9001.

By applying this technology to air blowers, industries all over the world will decrease their energy costs while actively contributing to a better environment.

**Completing its ZS range of screw type air blowers, Atlas Copco is laying down yet another milestone on the road to innovative low pressure compressed air solutions.**

## Our Continuous Drive for Efficiency



Atlas Copco introduces its first compressor

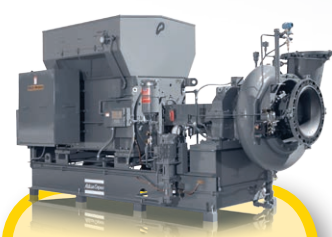
1904



The first dual-stage Z compressor with asymmetric screw design, resulting in a very low Specific Energy Requirement

1950's

1966



Atlas Copco introduces the single stage centrifugal blower (HA)



Launch of the ES system/controller, which optimizes the operation of multiple compressor installations.

1970's

1991

Atlas Copco introduces the single-stage Z compressor with asymmetric screw design (ZE/ZA)



The first integrated Variable Speed Drive (VSD). This revolutionary innovation allows energy savings of up to 35%.



1994

2002

2003

Launch of complete range of 'Roots' type rotary lobe blowers (ZL)



Introduction of the high-speed direct drive turbo blower range (ZB) for maximum energy efficiency

2004

2006



Atlas Copco launches its first energy efficient screw type air blower (ZS)

2008

2009



Atlas Copco introduces a full range of energy efficient **ZS screw blowers**, and withdraws its ZL lobe technology blowers.

2010

2011

Atlas Copco introduces its first 'U series' of oil-free screw compressors



The Z compressors are the first air compressors to be TÜV-certified as "oil-free" (ISO 8573-1 CLASS 0)



Atlas Copco introduces its range for optimal energy recovery



**Range extension with :**  
\* multistage centrifugal blowers and exhausters  
\* Air foil turbo direct drive air blowers (Under HSi brand)





# “Save an average of 30% with the Atlas Copco aeration blowers”

Atlas Copco's ZS range of 100% oil-free screw blowers is the result of decades of experience in innovative screw compression design and manufacturing for higher pressure. For decades our customers benefit from our experience in innovative screw compression design and manufacturing for higher pressures. Now Atlas Copco's ZS range of 100% oil-free screw blowers brings the same benefits into the lower pressure applications.

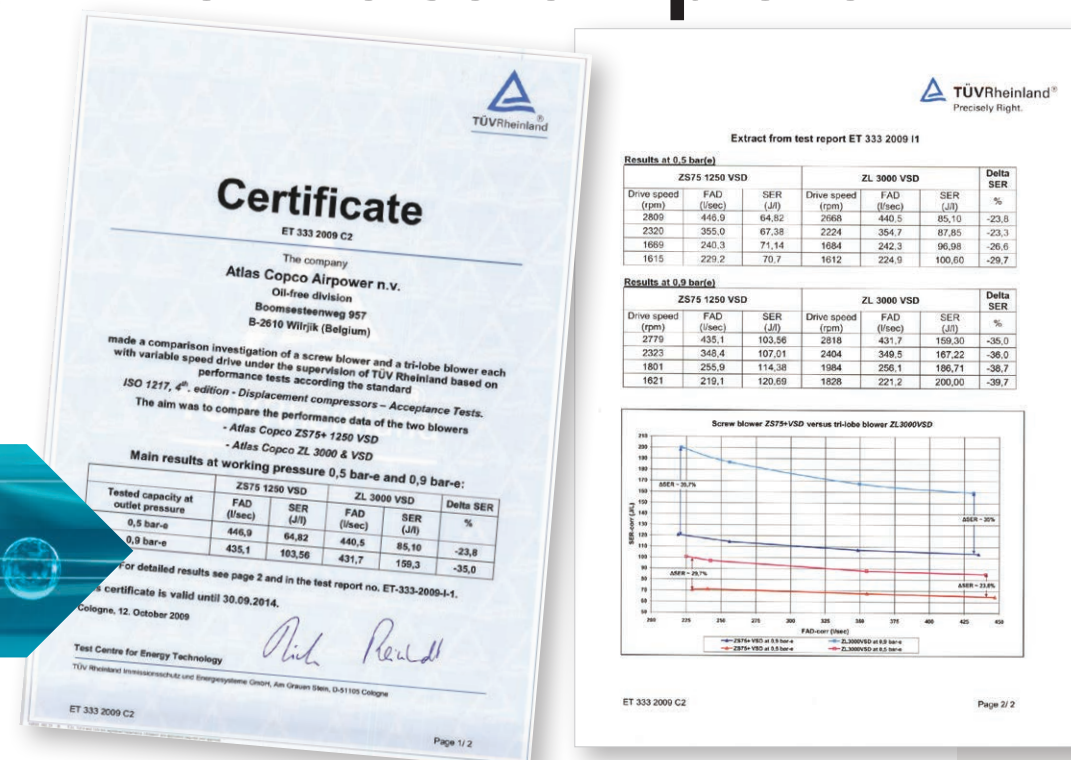
Designed for a flow range from 50 to 4600 m³/hr (147 to 2700 cfm) and pressures up to 1.2 bar(e) (18 psig), the ZS blowers incorporate the reliable and proven screw technology.

With the ZS+ VSD, customers can also benefit from cost savings on installation as this blower comes as a complete plug-and-run unit with an integrated Variable Speed Drive and controller.



The performance of the new ZS screw blower was tested against a tri-lobe blower by the TÜV, according to the international standard ISO 1217, edition 4.

## The superiority of the screw proven



It was proven that the ZS+ VSD is **23,8 percent more energy efficient** than a tri-lobe blower at 0,5 bar(e)/7 psig, and **39,7 percent** at 0,9 bar(e)/13 psig. The world-class efficiency of the ZS is mainly attributed to the superior screw technology.

### What is the TÜV?

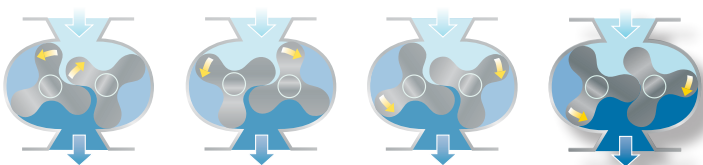
The TÜV, Germany's Technischer ÜberwachungsVerein or Technical Inspection Association, is an independent, international organization that specializes in evaluating the safety and quality of technology. The TÜV is recognized worldwide for its independence, neutrality, professional expertise and strict standards.



The ZS screw blower was developed in Atlas Copco's drive for innovation and its commitment to sustainable technology, and is on average **30% more energy efficient** compared to a traditional 'Roots' type lobe blower. The lobe blower, whose development has seen few advances since its introduction in the 19th century, clearly consumes far more energy.

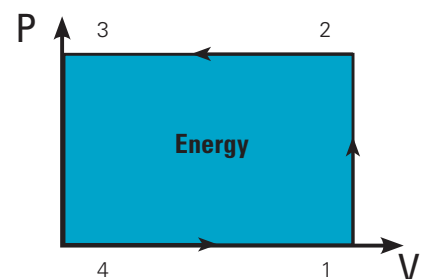
## Atlas Copco aeration blowers push energy efficiency to the limit

### Energy losses by lobe technology



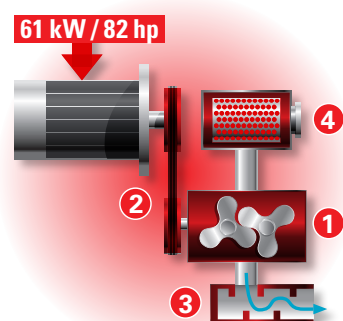
- 4→1: Suction.** Air enters the compression chamber. The air volume remains constant while the lobe rotors turn.  
**1→2: External compression.** The air is compressed externally due to back-pressure of the connected pipeline.  
**2→3: Discharge.** Air is pushed out into the pipeline

As shown in the Pressure/Volume diagram, the compression work is represented by the blue area and is proportional to the energy consumed.



Thermodynamic energy consumption

### Energy losses in packaging

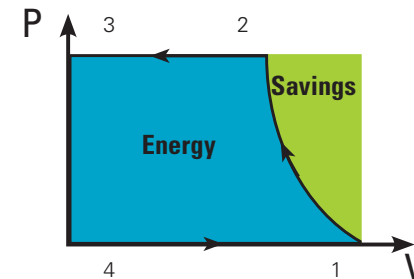


High resistance to the internal air flow lead to high pressure drops and increased energy consumption.

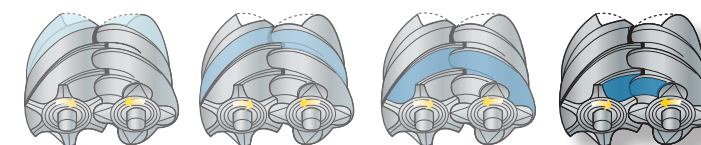
- Losses by:
- 1 External compression
  - 2 Belt/pulley
  - 3 Silencer
  - 4 Inlet filter

To deliver a flow of 1600 m<sup>3</sup>/hr (942 cfm) at a pressure of 0.8 bar(e) (11.6 psig), the tri-lobe blower consumes 61 kW (82 hp) on average.

### Energy savings by screw technology



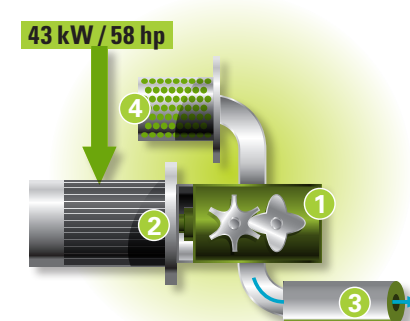
- Thermodynamic energy consumption
- Energy savings



- 4→1: Suction.** Air enters the compression chamber.  
**1→2: Internal compression.** As the rotors move towards each other, the air volume decreases.  
**2→3: Discharge.** Air is pushed out into the pipeline

As shown in the Pressure/Volume diagram, the compression work is represented by the blue area and is proportional to the energy consumed. The green area represents energy savings of a screw blower compared to a traditional 'Roots' type rotary lobe blower. This is due to the internal compression.

### Energy savings by integration



In the ZS screw blower, the internal air flow path is optimized to reduce pressure drops and air turbulence.

- Maximum savings by:
- 1 Internal compression
  - 2 Integrated gearbox
  - 3 Smooth silencer
  - 4 Inlet filter

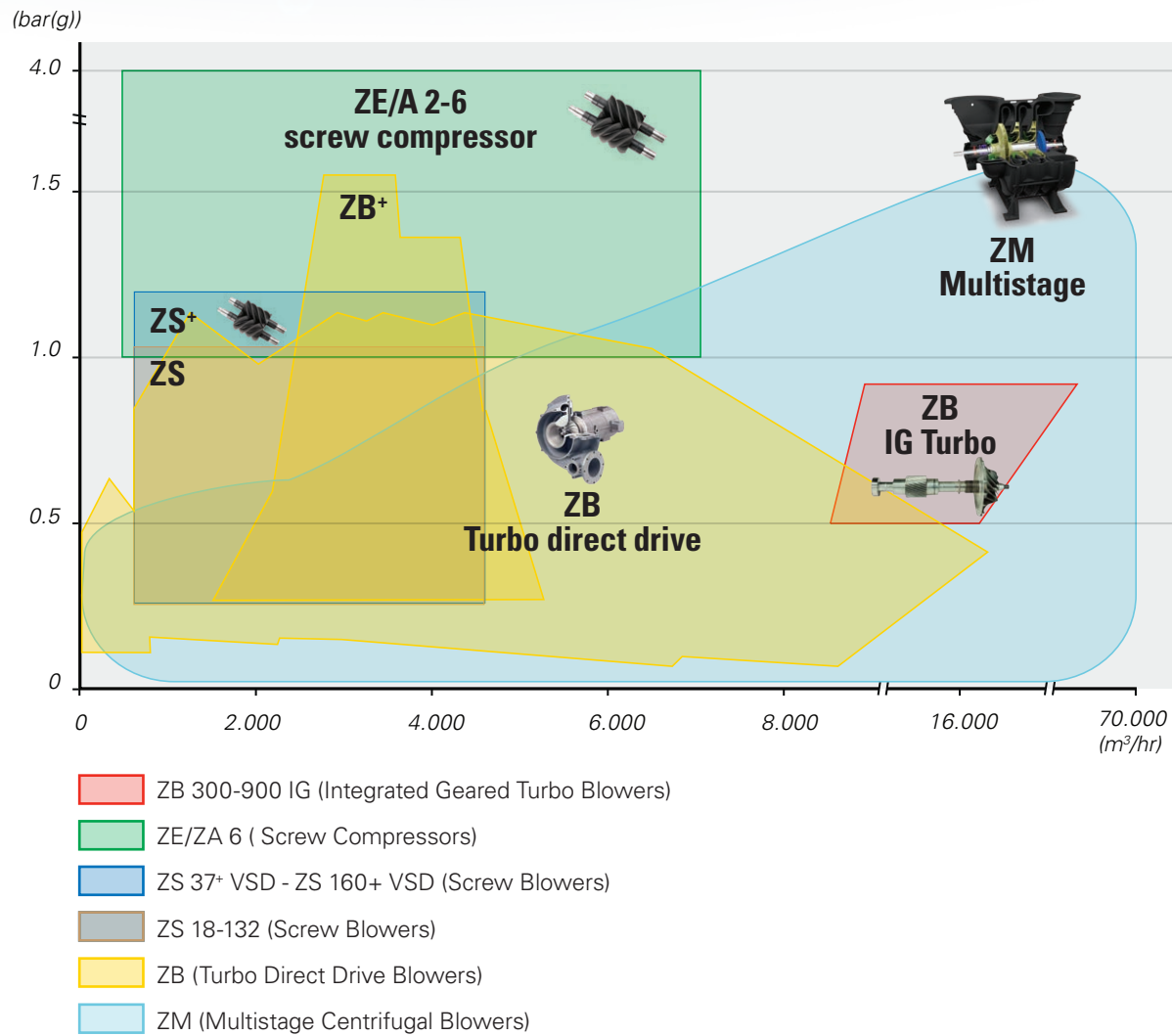
To deliver a flow of 1600 m<sup>3</sup>/hr (942 cfm) at a pressure of 0.8 bar(e) (11.6 psig), the screw blower consumes 43 kW (58 hp) on average.





Whatever your compressed air needs are Atlas Copco offers you a comprehensive range of compressors and blowers for pressures between 0 and 4 bar(e)/58 psig. Whatever your compressed air needs, our energy consultants can always recommend the right solution for you.

# Atlas Copco has an energy-saving technology to meet any demand



## Spectacular energy savings with the ZB high speed turbo direct drive blowers

The ZB 100-160 VSD is a 100% oil-free high speed turbo direct drive blowers with an integrated Variable Speed Drive (VSD). Thanks to the integration of revolutionary technologies, the ZB 100-160 VSD is highly efficient and maintenance costs are reduced to a minimum. This results in exceeding life cycle cost savings. Moreover, its compact design and low noise level make this blower the correct solution for large range of applications.



## Save an average of 30% with ZS aeration screw over conventional lobe blowers

Time to change. Install tomorrow's technology today. **The new Atlas Copco ZS blowers**, with superior screw technology, are on average **30% more energy efficient** than traditional rotary lobe blowers, providing you exceptional reliability and efficiency, while driving down energy costs and saving you money. It all adds up to sustainable productivity for today's low carbon economy.





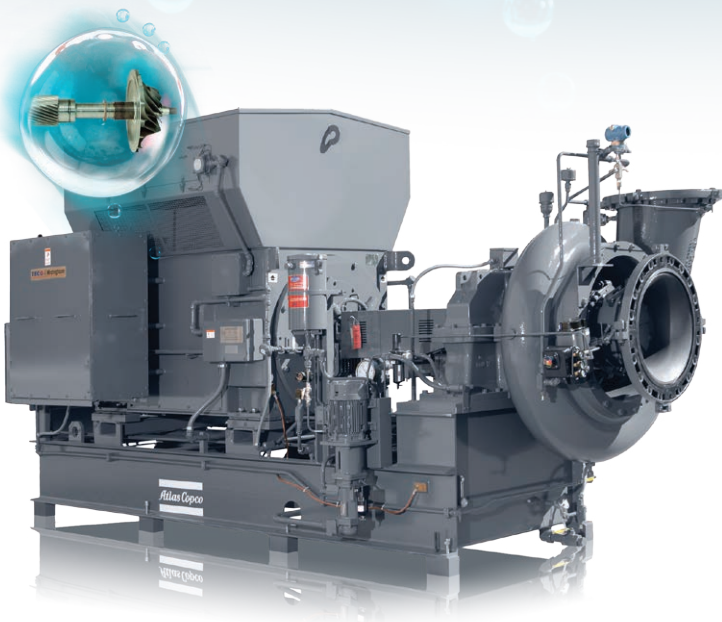
## Higher pressure with ZE/ZA for deep tank or pond aeration

A reliable supply of 100% certified oil-free compressed air is critical to ensure production continuity. Atlas Copco's low pressure ZE/ZA compressors offer a constant air flow at minimal energy costs. Delivered ready for use, they come as all-in-one packages including a powerful controller, aftercooler and integrated Variable Speed Drive (VSD). The compact design eliminates the need for extras and reduces installation to an absolute minimum, saving you time and money.



## The integrally geared turbo ZB 300-900 reduces energy consumption

The ZB 300-900 blower is a single stage integrally geared turbo blower which incorporates the latest energy saving aerodynamic design for increased efficiency at maximum flow. Key components of the ZB 300-900 compressor package are the aerodynamic section, the integral gear, the lubrication system and operating controls. The ZB 300-900 is capable of fulfilling a wide range of applications and stands for high reliability and proven design to ensure peace of mind.



## Efficient and reliable ZM oil-free multistage centrifugal blowers (pressure and vacuum)

The ZM oil-free multistage centrifugal pressure and vacuum blowers are custom-engineered and offer increased efficiency (particularly at higher flows) thanks to a wide range of optimized configurations available.

The ZM blowers can be used in a variety of air, gas, pressure and vacuum applications.

## Energy efficient controls

Offering the most efficient blower is only part of maximizing your total system efficiency. Without proper control systems in place, maximum efficiency is not achieved.

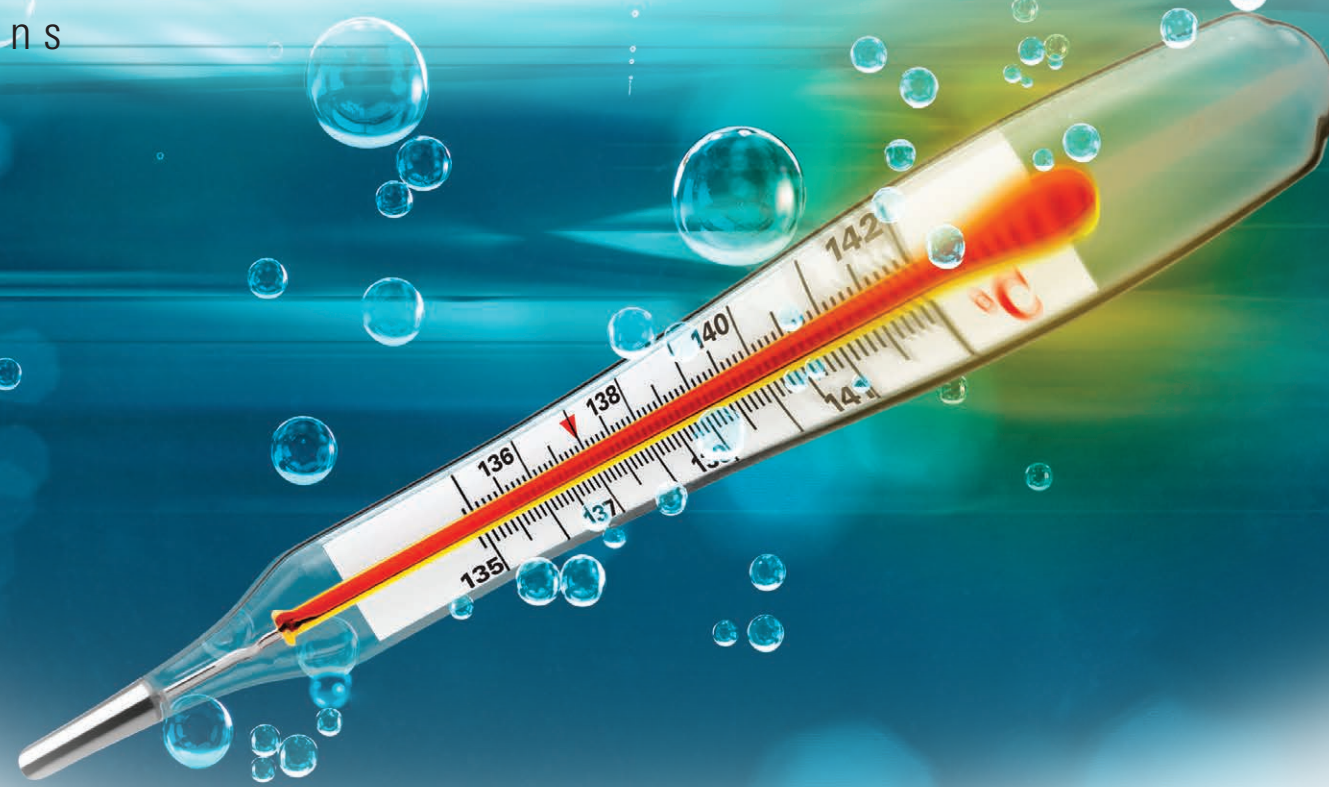
Local controllers closely monitor the compressor running conditions and maintenance status for the highest reliability.

Process control systems operate to satisfy or maintain any process input variable such as flow, pressure, or dissolved oxygen level. What makes Atlas Copco unique is we can accomplish this while maximizing energy efficiency and reliability of the blower system as a whole.

We offer pre-engineered control systems to operate a wide variety of applications and an ideal mix of blower technologies (hybrid systems).







## Are your blowers overheating?

### Try the screw technology... ...with our rental solutions

Is your LOBE blower broken down again and do you need air urgently to keep your PROCESS going? Experience the trouble-free ZS+VSD rental that will convince you to invest in this new blower technology.

<http://www.atlascopco.com/asrauus/>

Atlas Copco Specialty Rental's commitment to safety is second to none. There is simply no room for compromise. Next to well trained employees, well maintained equipment is the base for this approach. To illustrate the importance, the division was rewarded with the triple ISO certification (ISO 9001, ISO 14001, OHSAS 18001). Our worldwide use of the same processes, quality and environmental standards result in reduced energy consumption and CO<sub>2</sub> emissions.



## Cure it with our screw technology

### Service plan keeps your blower operating at maximum efficiency with the lowest possible running cost

The availability, quality and maintenance of your blower has a direct effect on your effluent quality and ultimately affects your bottom line. Irregular, insufficient or unprofessional maintenance could result in expensive downtime with a subsequent loss of production, affecting your profitability and damaging your reputation.

To ensure continuous productivity, Atlas Copco has compiled a portfolio of aftermarket services that guarantees the protection of your investment and provide the highest quality of service. Depending on your requirements, we can deliver parts kits and provide a range of service plans, tailored to suit your needs.

### Our Commitment

With a presence in over 170 countries, we will deliver high-quality customer service anywhere, anytime. Our highly skilled technicians are available 24/7 and are supported by an efficient logistics organization, ensuring fast delivery of genuine spare parts when you need them.

### Always in touch with the latest technologies

We are committed to providing the best possible know-how and technology to help your company produce, grow, and succeed. With Atlas Copco you can rest assured that your superior productivity is our first priority!

