

# TURBO BLOWERS

## AERZEN TURBO GENERATION 5

Intake Volume Flows from 1,200 m<sup>3</sup>/h to 16,200 m<sup>3</sup>/h



**AERZEN**

# AERZEN TURBO GENERATION 5. DESIGNED TO HANDLE UNSOLVED ENERGY PROBLEMS.

- Energy savings of up to 30% in combination systems
- Up to 80% operational efficiency
- Minimal maintenance costs
- High degree of reliability and longevity
- 100% oil-free

This is the key unit in the most efficient combination design – and the power behind every municipal or industrial waste disposal facility: the Aerzen Turbo Generation 5. Unbeatable, AERZEN's mix of blower, hybrid and Turbo technology. Designed for large intake volume flows of between 1,200 m<sup>3</sup>/h and 16,200 m<sup>3</sup>/h. Variable frequency controlled, 100% oil-free,

and tailor-made for the most demanding applications in waste water treatment. The powerful Turbo blowers from AERZEN will astound you with hitherto unknown savings. And delight you during normal operation with their minimal maintenance needs, easy handling, and robust nature. A typically Aerzen Turbo.



# LIFE-CYCLE COSTS AND ENERGY REQUIREMENTS. LESS IS THE NEW MORE.

The newest Turbo blowers from AERZEN use up to 30% less energy than previous generations. Some say they are revolutionary when it comes to operational efficiency, life-cycle costs, and economy. AERZEN thinks that this is simply the most responsible way to manage resources in waste water treatment plants.



*Precise load cycle calibration: for a new level of efficiency in aeration tanks*

## **Stimulating: the new peak values.**

When you realize that energy consumption in conventional waste water treatment plants can be up to 80% of total costs, then the impact becomes clear: every percentage point in savings counts. Both in terms of cost and the environment. The performance values for the Aerzen Turbo Generation 5 mean maximum efficiency in waste water tanks. In numbers: energy savings of up to 30%. And up to 80% operational efficiency. That is truly amazing – practically revolutionary!

## **100% Turbo.**

There are many factors that determine the extraordinary efficiency values of AERZEN power units. The most important is that only AERZEN technology goes into the Turbo. The entire unit is engineered and designed from top to bottom with your application in mind. All components are specially developed to work hand in hand. That is what makes the Turbo blowers from AERZEN as unique as their outstanding energy consumption values.

**Energy gain included.**

In its design for the energy-saving Turbo unit, AERZEN added a feature to save even more: energy recovery. Hot air from the motor cooling system is exhausted via a separate flange, opening up a potential source of energy that is practically free, and that can be used where it makes most sense: the results are cooler machine rooms and prevention of unnecessary heating of the aeration tanks.



*Using warm air from the motor*

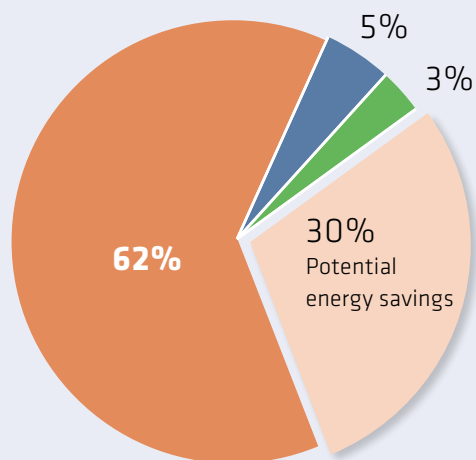
**Benefits for life-cycle accounting:**

- extremely long-lived and robust Turbo units
- up to 30% energy savings in combined systems
- up to 80% efficiency
- 100% oil-free
- perfectly integrated and highly efficient individual components
- minimal maintenance needs (preventive only)
- practically zero wear
- smart heat recovery
- enormous control range from 10% to 100% when combined with Delta Hybrid and Delta Blower

**Reducing Life-Cycle Costs.**

Average operating costs for a turbo blower over 10 years:

- Energy
- Investment
- Maintenance



# DYNAMICS. PERFORMANCE. INTELLIGENCE. A TURBO IN EVERY DETAIL.

**Decisive for performance values and energy efficiency: the impellers, drive motors and frequency converters in each speed controlled turbo blower. This is why we do not follow common standards in this regard. Instead: key components developed especially for different areas of application. So that when we call it a turbo, it really is a turbo.**

## **Optimally designed: the impeller design.**

What distinguishes an Aerzen Turbo impeller from a regular turbo impeller? Basically everything. Take design, for example. The Aerzen Turbo Generation 5 is the result of complex CFD-based flow analyses. Each impeller is carefully designed to meet the needs of a particular performance range. That is why Aerzen Turbo impellers are considerably more effective than those where diameter is the only customized element.

Another unique AERZEN feature is the material: stainless steel instead of aluminum. This allows for decidedly better aerodynamic properties. And stainless steel also leads to better efficiency, greater longevity, and consistently lower lifecycle costs. This is because stainless steel is practically abrasion-free and corrosion-resistant.



*The Aerzen Turbo impeller*

## **Intelligent security: the frequency converter.**

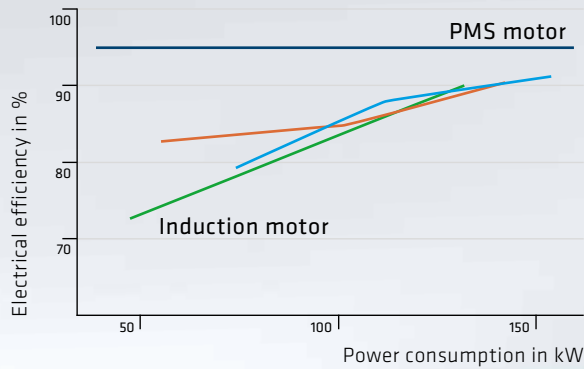
New: the Aerzen Turbo frequency converter (TFC), which controls only the rotational speed based on the motor current. Guide vanes are not moved. There are advantages to this. The TFC is simpler in construction, more reliable, and completely maintenance-free. And much more efficient in operational performance, thanks to the high rise-to-surge (active surge protection), a new technology from AERZEN. This makes the TFC (compared to other standard industrial converters) less sensitive to pressure fluctuations, more responsive, and more stable in operation over the entire range of the turbo map. This is also the basis for a combination of positive displacement and centrifugal blowers.

All parameters are constantly monitored to prevent uncontrolled surge line shutdowns during unexpected fluctuations. This makes the TFC a decisive factor in the reliable and safe operation of water treatment plants. Another unique feature: this frequency converter was created by AERZEN's own R&D innovators. Another pioneering success from Turbo technology.



*Integrated frequency converter, with pullout cabinet*

### Induction vs. PMS motors: a comparison.



### Driven by innovation: the PMS motor.

There is a special motor driving the Aerzen Turbo: the permanent magnet synchronous (PMS) motor. Its characteristics: extremely efficient, energy-saving, highly innovative, and far superior to conventional motors. Because AERZEN developed this motor especially for the Turbo. Because the rotor

does not require any additional energy for magnetization. Because, together with the TFC, it was designed to meet the fast response time requirements of Turbo technology. And because this motor demonstrates exceptional performance efficiency of up to 96%, even in partial load operation.

### Capable of absorbing any pressure fluctuation:

#### Air foil bearings for the PMS motor

There is a reason the AERZEN PMS motor comes equipped with air foil bearings: this technology, borrowed from the aerospace industry, is simple in construction and convincing in function. A cushion of air is created as soon as the shaft begins to rotate. This type of bearing has several advantages over more complex methods:

- uncomplicated, closed system
- contact- and vibration-free operation
- highly functional without the need for peripherals (i.e. electronic control system, safety bearings, auxiliary electronics such as backup battery systems, etc.)
- no components subject to wear
- extremely rugged and durable
- 100% maintenance-free
- able to withstand even large-scale pressure variations
- 100% oil-free
- energy-saving idle mode



*Simply superior: the PMS motor air foil bearings*

# INTELLIGENT AND FARSIGHTED. THIS IS HOW HIGH EFFICIENCY IS CONTROLLED TODAY.

High-performance technologies such as the Aerzen Turbo help reduce energy consumption in aeration tanks. Provided, of course, that they run at optimal efficiency. In the Turbo Generation 5, this is handled by AERZEN's advanced control and operating system. One out of many success stories from our R&D team while moving towards to the new Turbo Generation 5.



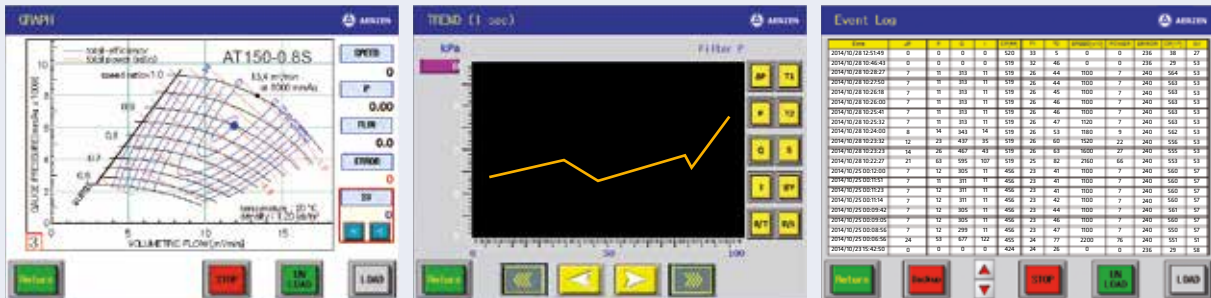
*Everything at a glance: the AERZEN touch panel*

## **Dynamic safety: the Turbo control system.**

Fast response times. Secure protection against surge and choke limits. Real-time transparency and monitoring of all relevant operational data. The precise control of a Turbo comes with its own set of requirements. This is the reason we

decided against standard solutions and developed software especially for our high-efficiency Turbos. The result is a fully integrated digital system. Highly functional. Easy to manage via touchscreen. And equipped with all relevant interfaces, such as to your process control system.





**Unique: the Turbo idle mode.**

The design of the AERZEN air foil bearing allows for extremely low rotation speeds. This means that frequent starts and stops during intermittent processes can be avoided with the energy-saving idle mode.

One of many options among the Aerzen Turbo controls.

**Real-time transparency:**

The Aerzen Turbo control integrates all Turbo blower parameters with permissible minimum and maximum values (surge limit, maximum RPM, overload, etc.):

- intake filter pressure differential
- differential pressure
- volume flow
- intake and discharge temperatures
- RPM
- electric power
- operating hours
- error codes and error history
- live visualization of Turbo parameters

**New: actual air volume measurement.**

When it comes to absolutely secure plant operation, we don't allow any compromises. That is why AERZEN doesn't rely on conventional, indirect (i.e. air volume measurement derived from power consumption) flow measurement. Instead, we use the Venturi effect. More precise, the actual air volume flow is calculated by measuring the pressure differences at the intake

cone. No other system does this, despite some decisive advantages: the unit can use real values for safety measures such as the AERZEN high rise to surge (active surge protection). And you can determine the flow actually being transferred into your tanks at any given time. And by the way: the software will also display this parameter for you directly on the panel.

*Unrivalled: real-time air volume measurement in the Aerzen Turbo*



# CONVENIENT FROM 0 TO 100. THE AERZEN TURBO READY-TO-RUN CONCEPT.

Just plug it in and start it up. It's that easy. After all, your Turbo unit comes from the factory fully configured and assembled. And, of course, tailored precisely to your process requirements. A comfortable turbo right at the first sight. That's typical of AERZEN. Another reason that the turbo has had such a positive reception.

Ready to connect: Supplied with the standard model



- 1 Discharge valve**
- solenoid valve controlled

- 2 Process filter**
- easy to access and replace



- 3 Motor cooling turbo**
- demand-oriented and energy-efficient cooling for the main motor
  - heat recovery

- 4 Exhaust silencer**
- Exhaust can be directed up or down as required

- 5 Frequency converter**
- completely integrated
  - pullout cabinet
  - with RFI filter (optional)

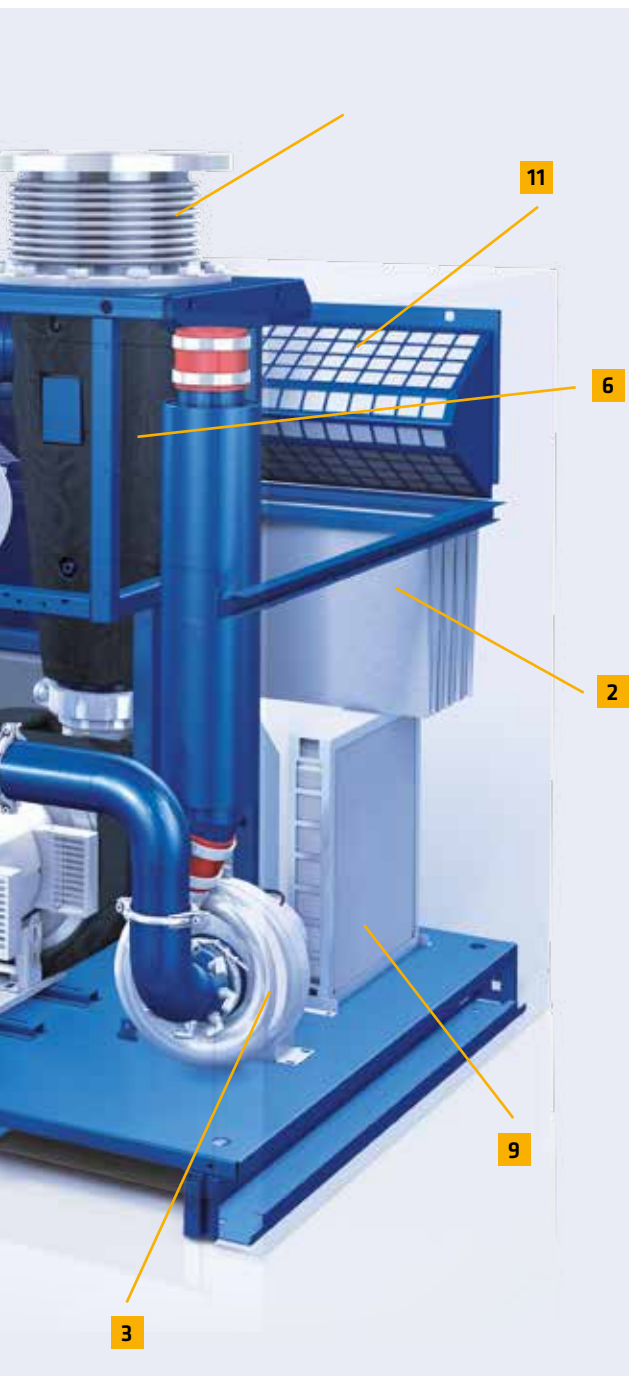
- 6 Cone diffusor**
- flow-optimized pressure generation



**Perfect additions:**

**Accessories, modifications, extensions.**

- optional temperature range extension by directly ducted or air conditioning system
- simple, cost effective conversion from standard room to ducted inlet
- pressure-loss optimized non-return valve
- discharge silencer to reduce noise entering the discharge piping
- Expansion joint with internal guide sleeve



**7 Aerzen Turbo control**

- designed and developed especially for the Turbo technology



**8 Turbo motor**

- air foil bearings, impeller, and PMS motor
- with integrated air flow measurement

**9 Intake silencer**

- flow-optimized, noise-reduced process air

**10 Expansion joint (optional accessory)**

- for stressfree connection to the discharge piping



**11 Optional**

- intake via ducted inlet

# THERE'S A LOT TO BE SAID ABOUT THE ECONOMICAL TURBO. WE'LL KEEP IT SHORT.

AERZEN has been manufacturing Turbo blowers since 1911. In the decades since then, we have reached new heights in improving the technology of these units. And are setting new standards with the expertise we've achieved. These standards are reflected in the performance characteristics, the components, in all the details of our latest Turbo. Find out for yourself: the Turbo Generation 5.

## 100% Turbo

- for mid and high airflows
- from 1,200 m<sup>3</sup>/h to 16,200 m<sup>3</sup>/h
- variable frequency control
- 100% oil-free

## Made by AERZEN

- specific AERZEN design for components
- robust and reliable
- on-site service
- perfectly matched and completely integrated

## Efficient peak values

- up to 30% energy savings
- up to 80% efficiency
- minimal maintenance costs
- control range from 40-100%
- highly efficient individual components

## Power motor

- PMS – Permanent Magnet Synchronous Motor
- no need for additional magnetization energy
- extraordinary performance and response times
- highly efficient during partial load operation
- stainless steel impeller

## Air foil bearings for extreme demands

- contact-free and vibration-free operation
- no components that would be subject to wear
- absorbs even extreme pressure fluctuations
- development from the aerospace industry
- low energy idle mode
- 100% maintenance-free

## Ready-to-run concept

- unit comes fully assembled
- easy conversion to direct ducted inlet
- wide range of accessories





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#### **Direct air flow measurement**

- in real time using the Venturi effect

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#### **Innovative frequency converter**

- active surge protection (high rise to surge) with variable frequency control based on motor current
- outstanding response times
- insensitive to high loads and pressure fluctuations
- allows for a combination with positive displacement blowers

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#### **Added advantage: heat recovery**

- intelligent use of wasted heat

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#### **Advanced controls**

- integrated operation and control system from AERZEN
- real-time transparency and monitoring of all relevant operational parameters
- touchscreen visualization
- open to your process control system (Profibus, ModBus, ProfiNet, etc.)

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#### **Performance<sup>3</sup>**

- key unit in highly efficient blower combinations
- superior technologies: Aerzen Turbo Generation 5, Delta rotary lobe blower, and Delta Hybrid rotary lobe compressor
- highly efficient, from low to peak loads
- ROI possible within 2 years
- control range from 10% to 100%

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#### **Intelligent design**

- compact design
- space-saving side-by-side installation
- easy to transport
- plug & play installation and commissioning
- easy access for maintenance work
- low sound pressure levels
- minimal maintenance needs (preventive only)

# AERZEN TURBO. THE KEY PLAYER IN HIGHLY EFFICIENT COMBINED SYSTEMS.

Strong fluctuations are the hallmarks of load operations in biological sewage treatment plants. They can come on suddenly, since waste water pollution levels can change depending on the region, time of day and season, or precipitation. AERZEN has the most effective solution for this kind of challenge: the combination of advanced Turbo blowers, rotary lobe blowers, and rotary lobe compressors in an almost revolutionarily efficient network system.



## **Performance<sup>3</sup>.**

### **The revolution in your aeration tank.**

There is now a unique portfolio of solutions for oil-free oxygen supply to aeration tank provided by three high-performance machines – all from the same manufacturer: the Aerzen Turbo Generation 5 blower, the rotary lobe Delta blower, and the Delta Hybrid rotary lobe compressor. With a number of models to choose from, these units can be used to satisfy a wide variety of plant-specific requirements. In combination they can guarantee performance that for the first time can be tailored precisely to the needs of an ever-changing load profile – from basic loads to peak demands. This solution portfolio is what we call Performance<sup>3</sup>.

## **Energy saving potential – optimally exploited.**

Regardless of whether plants are being operated for municipalities or industry, the best mix of machine types and performance is always tailored to the individual case. The final configuration requires solid knowhow and a lot of experience – along with a team of experts from AERZEN who can effectively combine the whole range of available technologies. That is how you will discover the potential for process performance and energy efficiency in your plant.

### Fast ROI.

In a combined system, the advantages of the three high-performance technologies add up to hitherto unknown energy efficiencies in the operation as a whole: the highest possible energy savings, best possible control range, and lowest possible investment costs. These savings can make conversion pay for itself within two short years, depending on the plant involved.

**Sound interesting? Give us a call. We'd be happy to provide you with detailed information - without obligation, of course.**

#### Delta Blower Generation 5

##### Application: for small and midrange volume flows

Available volume flows: 100 to 14,400 m<sup>3</sup>/h  
Pressure range: 100 to 1,000 mbar  
Control range: 25% to 100%

#### Delta Hybrid

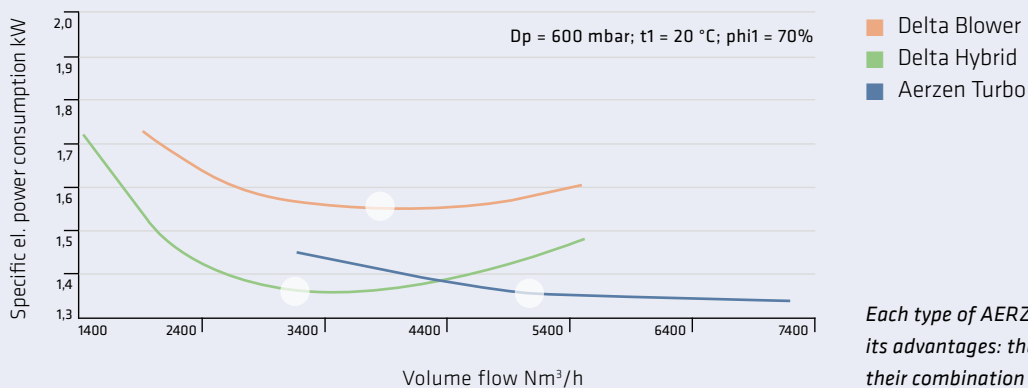
##### Application: for midrange volume flows and higher pressures

Available volume flows: 670 to 9,000 m<sup>3</sup>/h  
Pressure range: 100 to 1,500 mbar  
Control range: 25% to 100%

#### Aerzen Turbo Generation 5

##### Application: for high volume flows

Available volume flows: 1,200 to 16,200 m<sup>3</sup>/h  
Pressure range: 400 to 1,000 mbar  
Control range: 40% to 100%



*Each type of AERZEN technology has its advantages: the best solution is in their combination*

# SUPERIOR ADVICE. WASTE WATER TECHNOLOGY FROM AERZEN.

**High availability.** This is probably the most important criterion for choosing an Aerzen Turbo. Guaranteed by the almost legendary high operational safety of robust machines and a network of service professionals that spans the globe. What more would you want from the trailblazing experts in compressor technology? Well, perhaps one more thing: an enormous pool of knowledge that will be placed at your disposal when it comes to questions of application. Superiority that is yours for the asking.



*With AERZEN's experienced team of experts, you have an enormous pool of knowledge at your disposal for optimal plant design*

## **Made by AERZEN.**

The Turbo Generation 5 is made by AERZEN – including all its core components. From the initial idea and intelligent engineering to the individualized configuration. From the impeller and motor to the controls and frequency converter. This is how we can guarantee the reliability and high productivity of our Turbo and combination systems. For you this means security. The good feeling of having genuine, 100% Turbo performance at your disposal. And a system whose every element allows you to take advantage of all sources of potential savings. That is quality workmanship “Made by AERZEN.”

## **High availability – long-term.**

The best thing about the Turbo: you can relax. Once it goes into operation, it will function reliably and unobtrusively. You won't even notice it until perhaps you get the next energy bill. High operational safety and extremely long service life: typical for all AERZEN compressors. They are expressions of our own special quality standards. And a pillar of the reputation that AERZEN, a German family company with a long history, enjoys the world over.





*There for you when you need us -  
the world over. AERZEN*

**Service. When you need it, no matter where you are.**

You need service – even when you don’t need it. Our service teams will take care of your plant over its entire life cycle, helping to protect the value of your investment. We have created a close network that spans the globe: over 40 subsidiaries and representatives in more than 100 countries, so that we are never far from where you are. You can depend on it: one of our 100 service mechanics can be there for you quickly – if you should ever need one.

**Security = AERZEN.**

- commissioning by qualified experts
- individualized training for your in-house staff
- client-specific service and maintenance contracts
- remote maintenance system for your unit
- on-site service also available



**Well prepared. Our application expertise.**

There are 150 years of history behind our familiarity with a very wide range of compressor technology applications. And more than 25,000 configured waste water plants on every continent. A veritable treasure trove of experience. It is the basis for our unique expertise and innovation. And makes us valuable advisors for all your application questions. Take advantage of our knowhow when you want to equip your treatment plant both technically and economically for the coming decades.

952.783 Std.

2.489.237 S

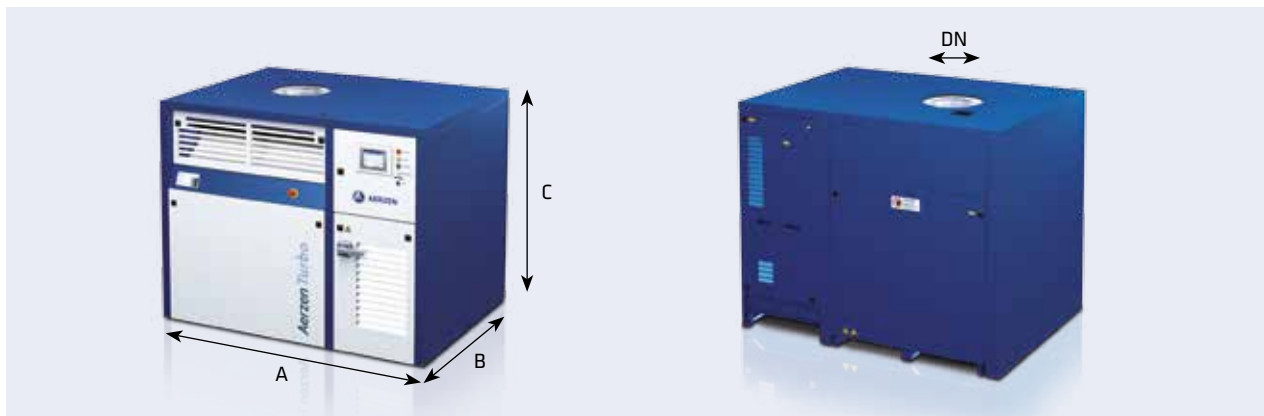
4.762.239 S

1.236.854 Std.

3.256.489 Std.

# EFFICIENCY OBJECTIVELY CONSIDERED. THE TURBO IN NUMBERS.

## Sizes and weights.



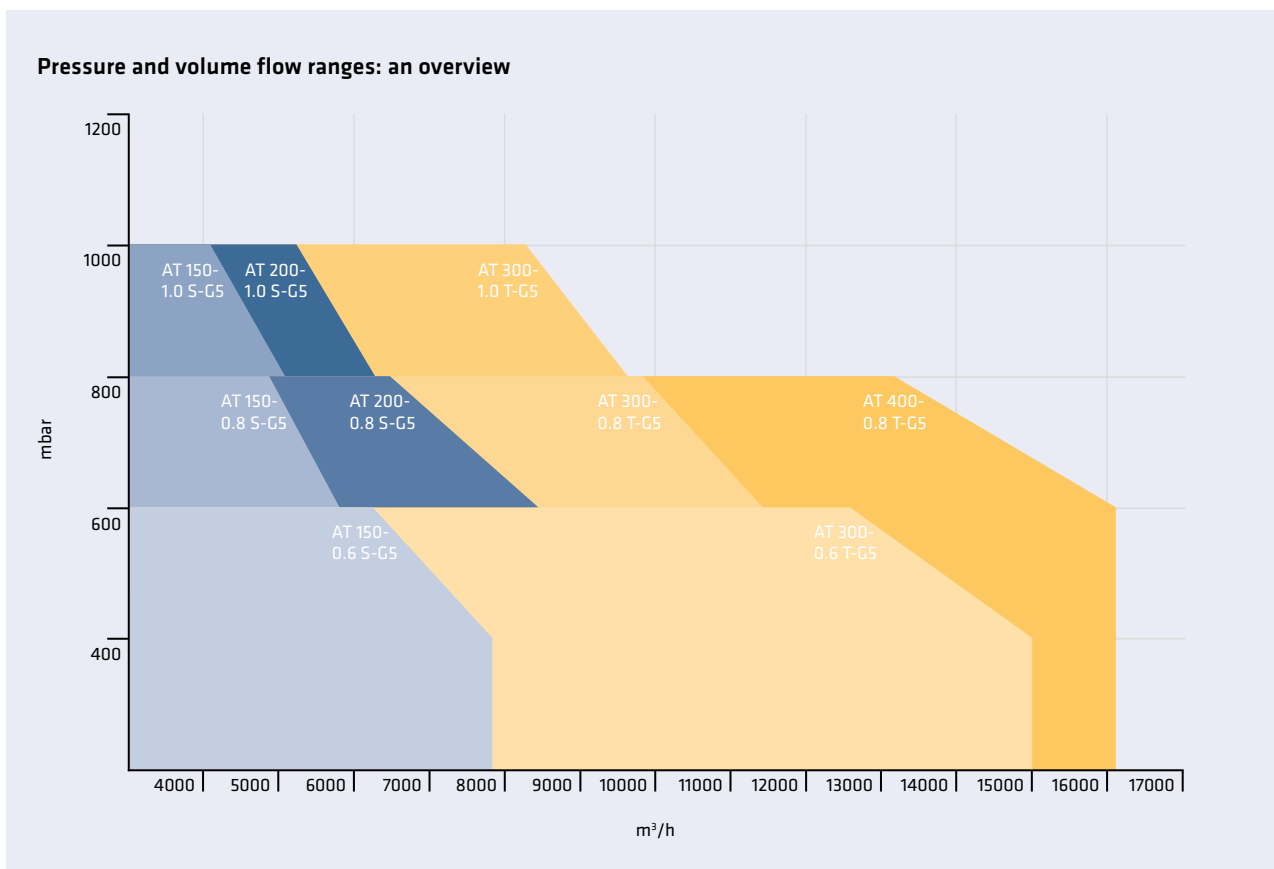
Blower models	Performance data				Sizes and weights				
	Pressure max. mbar	Volume flow max. m <sup>3</sup> /h	Motor performance max. kW	Sound pressure level max. dB(A)	Length A mm	Width B mm	Height C mm	DN	Weight kg
AT 150-0.6 S-G5	600	7800	120	76	1855	1460	1501	300	1080
AT 150-0.8 S-G5	800	5700	120	76	1855	1460	1501	250	1045
AT 150-1.0 S-G5	1000	5100	120	76	1855	1460	1501	250	1040
AT 200-0.8 S-G5	800	8400	160	76	1855	1460	1501	300	1090
AT 200-1.0 S-G5	1000	6300	160	76	1855	1460	1501	250	1055
AT 300-0.6 T-G5	600	15000	245	78	2450	2170	2105	500	2750
AT 300-0.8 T-G5	800	11400	245	78	2450	2170	2105	400	2650
AT 300-1.0 T-G5	1000	9600	245	78	2450	2170	2105	400	2650
AT 400-0.8 T-G5	800	16200	325	78	2450	2170	2105	500	2815

*(Subject to technical modifications – products subject to technical changes)*

*“Right-sized” is the magic word in efficient waste water treatment. There is a good reason the Aerzen Turbo G5 comes in several different models. But that is only the beginning of perfectly designed aeration technology. Ask the experts from AERZEN.*

# SHOWING THEIR STRENGTHS. THE UNITS AND VOLUME FLOWS.

Which Turbo unit can handle what kind of load? You'll find the answer in the wide range of Aerzen Turbo Generation 5 models for you to choose from. There are 10 different types available, depending on pressure requirements and volume flow.



*The Turbo types: variety for optimized plant configuration*



**AERZEN. Compression as success factor.**

AERZEN was founded in 1864 as Aerzener Maschinenfabrik. In 1868 we built Europe's first rotary lobe blower. The first turbo blowers followed in 1911, the first screw compressors in 1943, and in 2010 the world's first rotary lobe compressor unit. AERZEN innovations are a driving force behind the development of compressor technology. Today AERZEN is one of the world's oldest and most important manufacturers of rotary lobe blowers, rotary lobe compressors, rotary lobe gas meters, screw compressors, and turbo blowers. And in many areas of application, AERZEN is among the undisputed leaders.

There are more than 2,000 experienced AERZEN employees in over 43 subsidiary companies worldwide working hard to advance compressor technology. Their technological expertise, our international network of experts, and the constant feedback from our customers are what make us successful. AERZEN products and services have become standards in the industry for reliability, lasting value, and efficiency. Go ahead: challenge us!

Aerzener Maschinenfabrik GmbH  
Reherweg 28 – 31855 Aerzen / Germany  
Telephone: +49 5154 81-0 – Fax: +49 5154 81-9191  
info@aerzener.de – www.aerzen.com



**AERZEN**  
EXPECT PERFORMANCE