



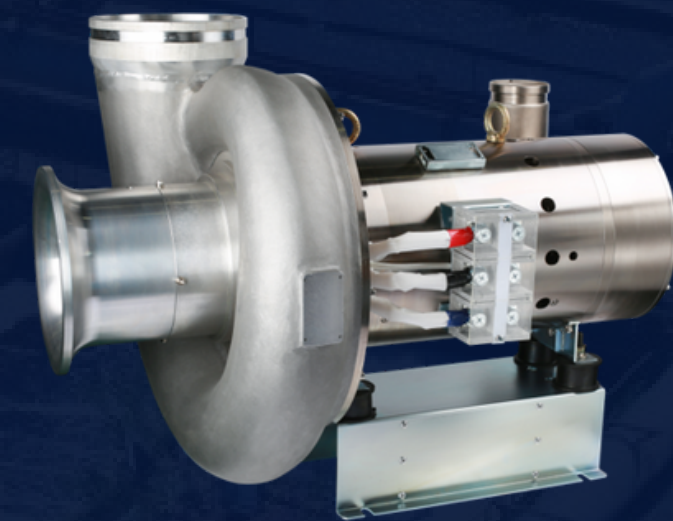
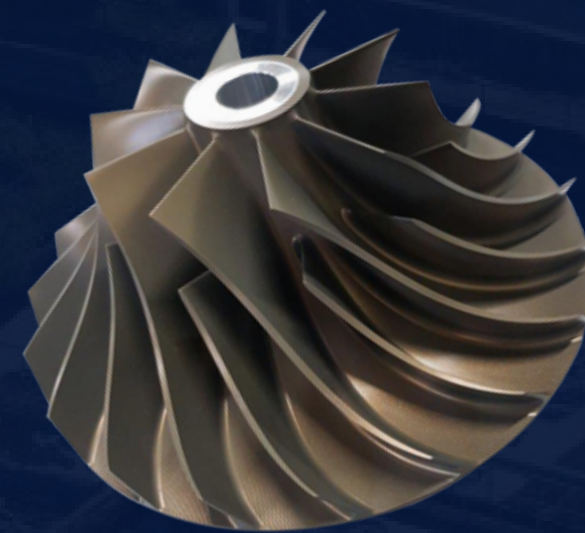
# EVEREST TURBO

LET'S **GO** VALUE ENGINEERING

## COMPARING TURBO BLOWERS & SCREW BLOWERS FOR WASTEWATER TREATMENT

**AERATION PROCESS IN WASTEWATER TREATMENT FACILITIES CAN BE ACCOMPLISHED WITH MODERN TECHNOLOGIES INCLUDING TURBO BLOWERS, ROTARY LOBE COMPRESSORS, AND POSITIVE DISPLACEMENT SCREW BLOWERS, ALL OF WHICH PROMISE ENERGY EFFICIENCY AND ENERGY SAVINGS.**

**EVEREST TURBO, CENTRIFUGAL BLOWER DIVISION OF EVEREST BLOWERS PVT. LTD. PRESENTS A COMPARATIVE ANALYSIS OF POSITIVE DISPLACEMENT SCREW BLOWERS AND TURBO BLOWERS TO HELP WASTEWATER TREATMENT FACILITIES MAKE THE RIGHT CHOICE TO SUIT THEIR AERATION REQUIREMENTS.**





# BEARINGS

**Everest Namwon** Turbo Blower's air bearing design utilises the speed of the air to avoid contact of the surfaces and is therefore free from friction and wear. It can only be used for high speed applications. Bump type air foil bearings developed by NASA and used in Everest Namwon Turbo Blower models have an advantage over leaf type air bearings with their higher load capacity. Their durability is measured not by the hours of operation but in the number of start-ups and turn-offs. Tested for 20,000 start/stops, air foil bearings offer the assurance of many years of operation without any decrease in blower efficiency. Blower's air bearing design utilises the speed of the air to avoid contact of the surfaces and is therefore free from friction and wear. It can only be used for high speed applications.

Rotary Screw Blowers use cylinder roller bearings that must operate in hot environments with high load, leading to wear and tear over time and requiring replacement after 3-5 years of operation, which results in major repair costs.

## BLOWER TYPE

In **EVEREST NAMWON** Turbo Blowers or Centrifugal Blowers, the energy is transferred from a rotating shaft to air or gas. A pressure rise is achieved by adding kinetic energy to a continuous flow of air through the rotor or impeller. The Turbo Blower differs from the Turbo Compressor by the lower pressure ratio, with compressor being above 2.5. Centrifugal Compressors increase pressure up to several hundred kPa, while the Centrifugal Blower performs in the middle range up to 100kpa.

Rotary Screw Blowers are Positive Displacement Blowers with precision timing gears that maintain minute clearances between two inter-meshing oil-free screw elements that are never in contact. However, contact parts such as gear and bearings in the blower package are exposed to wear and tear resulting in the gap between the screws getting larger over time, leading to air leaks. The teflon coating on the rotary screw air ends also deteriorates after a couple of years of operation, leading to loss of air flow delivery.



# MOTORS

**EVEREST NAMWON** Turbo Blowers use high efficiency high speed motors called Permanent Magnet Synchronous Motors or PMSM, which utilise permanent magnets to provide higher power output to a given frame size. Thanks to direct connection with the impeller, no power is lost during transmission. PMSM motors comply with the super-premium efficiency standard, IE4, which was only published by International Electrotechnical Commission in 2014. The PMSM motor is about 5-8% more efficient than the induction motor.

The Rotary Screw Blowers are equipped with standard induction motors, which lose about half their efficiency at lower operating speeds.

## CONTROLLERS

**EVEREST NAMWON** Turbo Blower use only major brands of controllers such as Siemens or RS for reliability and ease of servicing/replacement as well as for the flexibility to modify running parameters.

Screw Blowers feature proprietary microprocessor controls, which restrict the customers in choice and flexibility.

## RANGE

**EVEREST NAMWON** Turbo Blowers deliver a flow capacity up to 500 m<sup>3</sup>/min, pressure up to 10,000 mmWC and power up to 600 HP.

A Screw Blower has a limited operating range, with flow capacity up to 154 m<sup>3</sup>/min, pressure upto 12,000 mmWC and power up to 475 HP.



## MAINTENANCE (OIL & OIL FILTER REPLACEMENT)

**EVEREST NAMWON** Turbo Blowers do not use any oil. The bearings used are dry air foil bearings which are free from friction & wear. There are no gears.

A Screw Blower needs an oil & oil filter replacement every 2000 Hours of operation. Oil is required for lubrication of gears & bearings.

## MAINTENANCE (AIR END REPLACEMENT)

**EVEREST NAMWON** Turbo Blowers do not require any air end replacement.

A Screw Blower needs an air end replacement every 40,000-50,000 Hours of operation. This accounts for almost 60-70% of the cost of a new blower.

# TOTAL EFFICIENCY

A Blower Package comprises of a blower (compressor), motor, inverter (variable frequency drive), blow-off valve, controller, inlet filter and cooling system, assembled and operating inside the enclosure.

'Wire to Air' (Total) Power Consumption is the total energy used to produce the required flow and pressure for any particular application. It includes all power losses in the motor, variable frequency drive, inlet filter, guide vane, valves, cooling system, loss by compressor suction, temperature rise and pressure drop. The complete blower system must be tested for efficiency, as it's the 'wire to air' power consumption that is reflected in the electricity bill.

**EVEREST NAMWON** High speed Turbo Blowers are far superior to Rotary Screw Blowers in terms of overall 'wire to air' efficiency and 'total ownership cost'. This is because centrifugal compression efficiency is higher than rotary screw compression; turbo blowers do not lose capacity; package efficiency of turbo blowers is superior to screw blowers due to PMSM motor; direct transmission without any gear/bearing losses; no loss of capacity due to coating wear; and turbo blowers provide major savings in ongoing maintenance costs.



# CONCLUSION

Based on technical characteristics, turbo blowers outperform rotary screw blowers on every parameter; however, the final choice will depend on multiple factors, including the size of the plant.

**EVEREST TURBO** advises wastewater treatment facilities to consult with experts before making their selection.



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