

Rotary Vane vs. Rotary Screw Compressors

What's the Difference?

Although rotary vane and rotary screw compressors were developed at similar times and are designed to perform the same function, the two technologies differ greatly. Continue reading to learn how the two types of compressors compare in terms of efficiency, longevity & maintenance.

What is a Rotary Vane Compressor?

A rotary vane compressor is a volumetric rotary compressor, consisting of a rotor (with longitudinal slots in which the vanes slide) rotating within a stator (or cylinder). The rotor is offset in the stator so that when it turns on its axis, the vanes are pushed against the stator by centrifugal force.



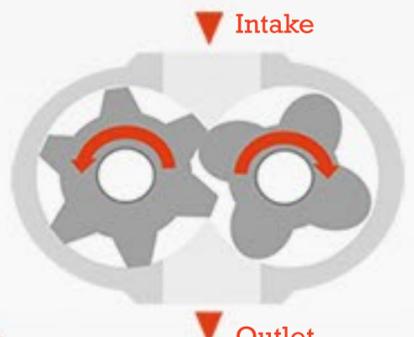
Compression



Intake

What is a Rotary Screw Compressor?

The screw compressor is a volumetric rotary compressor composed of two parallel rotors with external helical profiles (screws) which enables the two rotors to engage, one into the other. The two rotors are fitted in a stator made from two cylinders which intersect longitudinally and in which the rotors turn with a critical minimum clearance.



VS

There is a volume between the adjacent vanes. During rotation, this volume passes from a maximum value, corresponding with the maximum exit of the vanes, to a minimum value, at which point the stator becomes tangential with the rotor and vice versa. The volume increases during air intake and progressively decreases during the compression stage, until the delivery ports are covered by the vanes.

How Do They Match Up?

Rotary Vane

Rotary Screw



System Design



Rotary vane compressors are volumetrically more efficient because they have minimal internal air leakage. The vanes move freely in their slots, but are always in contact with the internal surface of the stator, so the air seal is near-perfect.

The design of Mattei's vane compressors ensures the correct operating temperature is quickly and effectively reached, thereby extending operating life by preventing condensation from forming in the system.

Many design qualities of a rotary screw compressor are detrimental to its operating efficiency and service life. Roller or taper bearings are required in a screw compressor because the rotors must operate at high speeds with high axial accuracy and minimal clearances between the rotors, housing and end plates. If the two screws touch or make contact with the stator, the compressor will seize. Additionally, oil is used to seal, cool and compress the air which results in blow-hole losses and declining efficiencies outside of the ideal speed range.



Reliability & Life Expectancy



Time does not reduce the performance of a well-maintained rotary vane compressor. Vane compressors can easily operate for 100,000 hours without wear. In fact, some Mattei compressors have been known to last well over 230,000 hours. There's no wear in a vane compressor's air end, which means the unit's efficiency stays constant throughout its operating life.

The rotors on a screw compressor must operate with high thrust and radial loads, while maintaining minimum clearances, so manufacturers must use roller bearings.

A rotary screw compressor's engineered bearing life is 50,000 hours, while installed air end life typically ranges from 35,000 to 40,000 hours between major overhauls.



Maintenance & Repair



Servicing a rotary vane compressor in the field is a simple process. Assembling and dismantling Mattei compressors can be carried out quickly using standard tools. It is also made easier by the light weight of the main components, most of which are made from aluminum. The ease of dismantling the machine into subassemblies (such as rotor/stator unit, regulating valves, cooler, etc.) makes fault diagnosis simple.

The only preventative maintenance required is to change the oil, clean and replace the air and oil filters and clean the radiators. Vane compressor parts are inexpensive enough that dealers often carry them on the shelf.

Screw compressor parts typically prone to wear include the rotors, roller bearings, gearbox, bearings and even the stator. Due to the inevitable wear of the bearings, the rotors eventually touch the cylinders in which they rotate—which will result in the replacement of the air end. The failure of the air end can cost up to 40% of the cost of a brand new unit.

There is usually a wait of several days or weeks for screw parts, as these items must be ordered and manufactured on-demand.

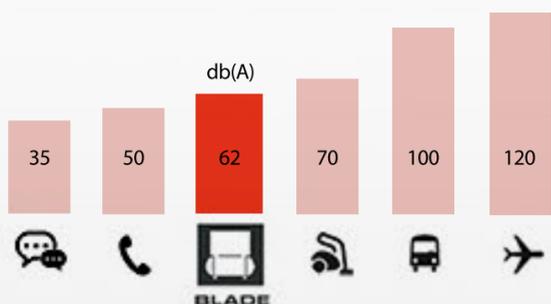
Don't get screwed. Get a VANE.



There's no question about it—Mattei's innovative rotary vane compressors can't be matched.

If you're looking for supreme efficiency and unrivaled performance, Mattei's BLADE compressor is the answer and the ideal product for small to medium commercial applications.

Advanced design, enhanced durability and unparalleled efficiency, combined with cutting-edge rotary vane technology, make the BLADE a pioneer in its field. We can assure you that the BLADE is your perfect solution.



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