



# Operating Principle

Rotary Vane Compressor

# Vane Compressor

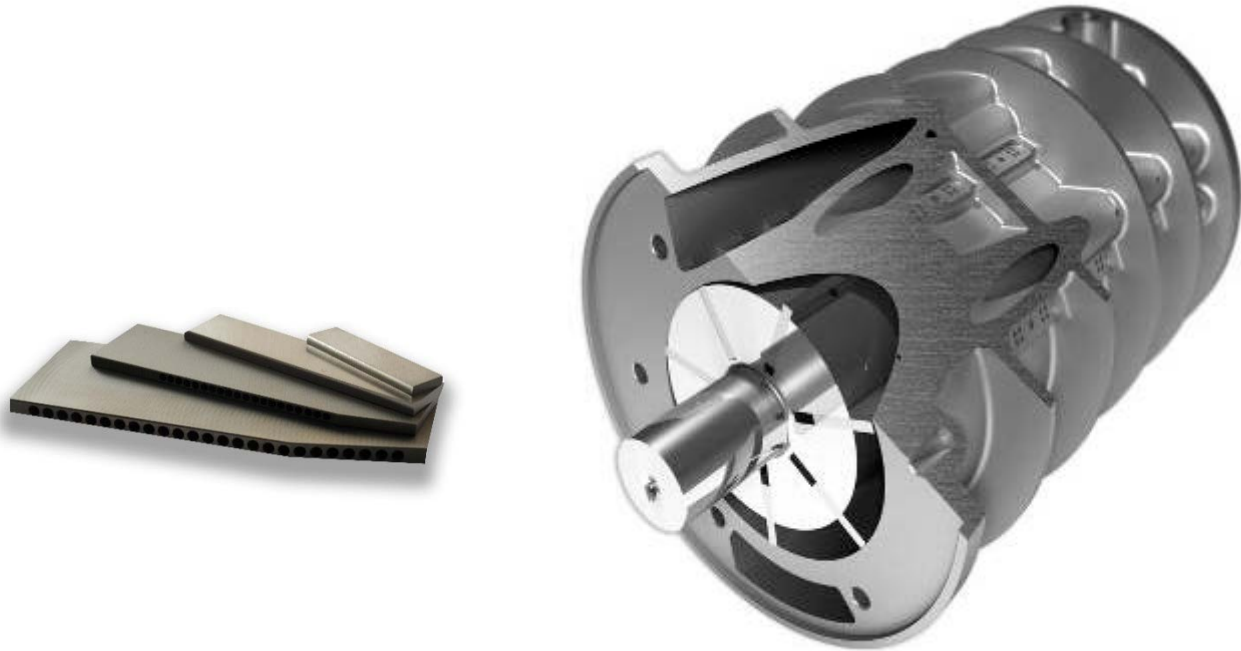


- ① The vane compressor is a volumetric rotary compressor.
- ① It consists of a cylinder (stator), of a rotor mounted eccentrically inside the stator, of a series of vanes that slide longitudinally inside the rotor slots and two end covers.
- ① While rotating the volume of space between two vanes reduces and the contained gas is compressed.

# Rotor Unit



- The cylindrical rotor, a single body with the shaft, has a series of radial slots along its entire length, in which the vanes are housed and move freely in and out.

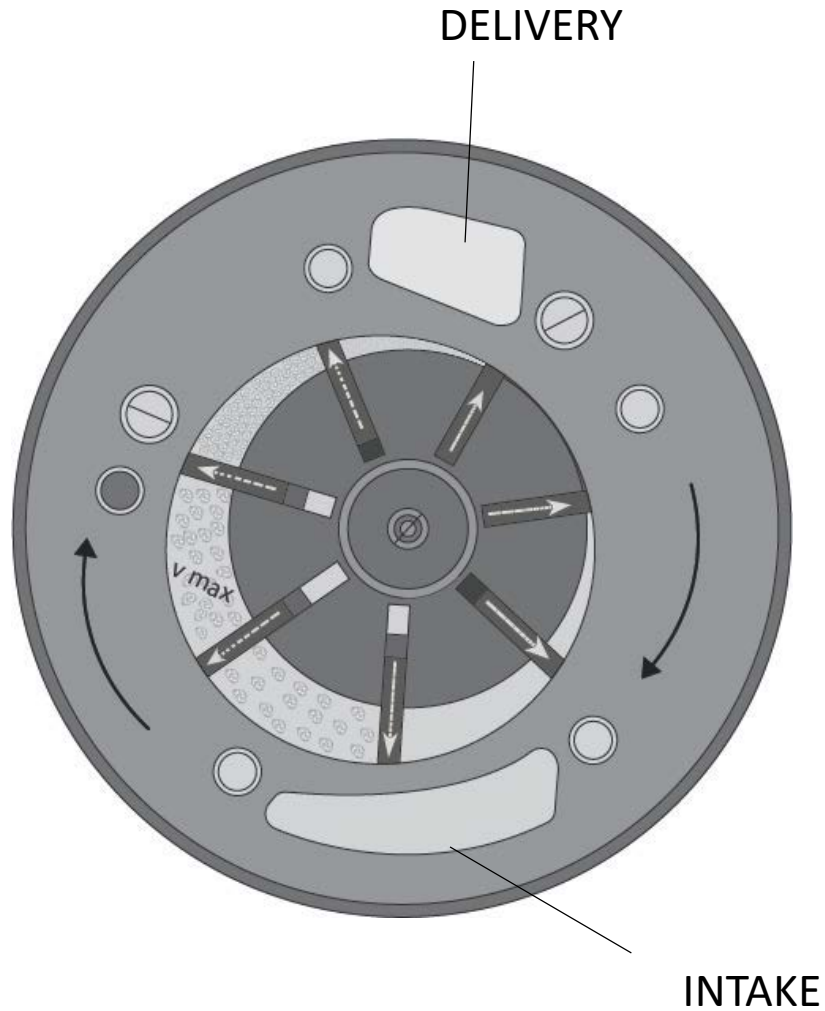


# Rotor-Stator Unit



- ① The cylindrical stator assembly is eccentrically bored, while the rotor is positioned in the centre, tangent to the stator.
- ① When the rotor turns, the vanes are pushed out by centrifugal force and kept against the stator inside surface. The volume between each vane varies according to its position: the reduction in volume from largest to smallest produces the discharge pressure.
- ① The rotor shaft is supported by white metal, pressure lubricated bearings.

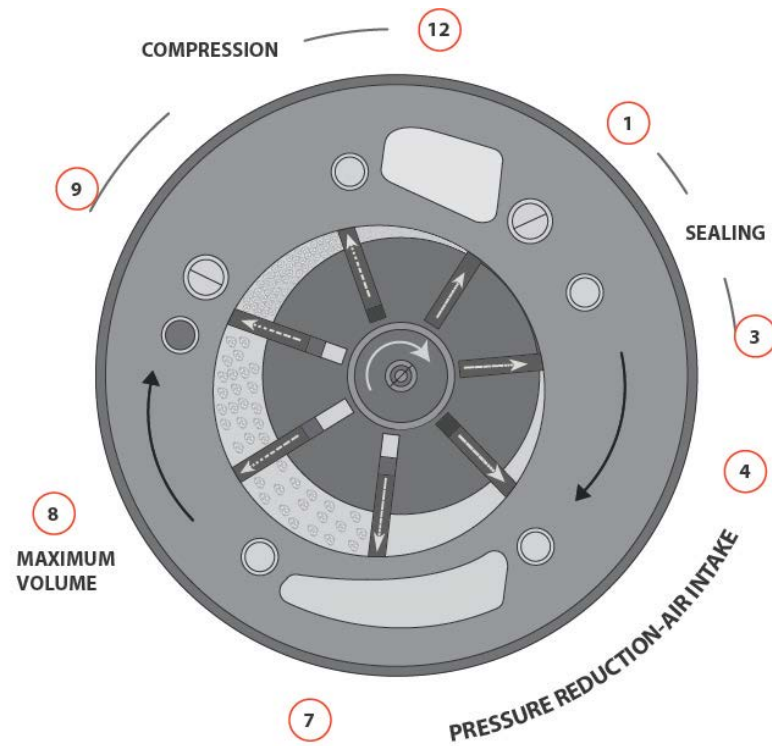
# Rotor-Stator Unit



# Compression Cycle



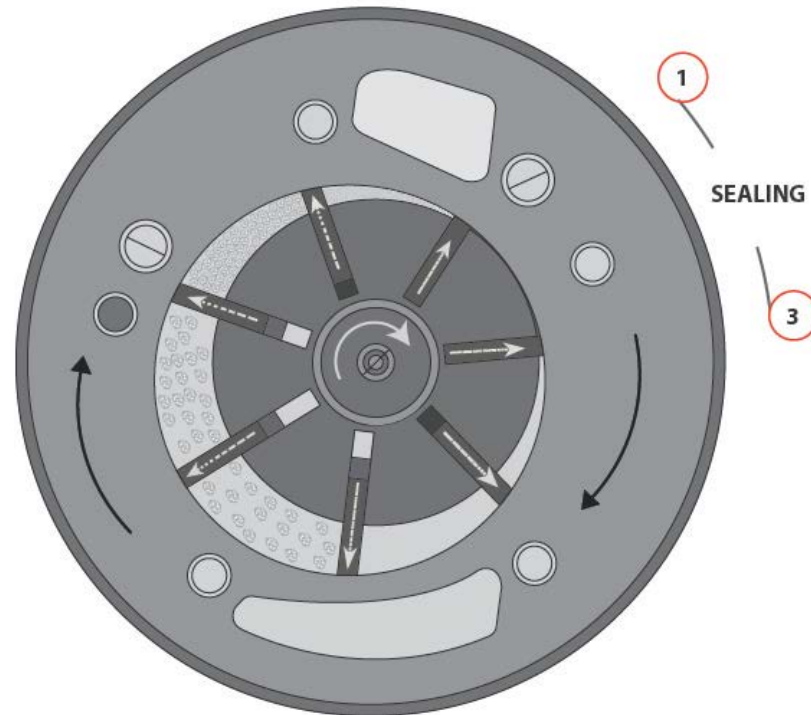
- To analyze the compression cycle you should ideally divide the circumference of the stator into 12 equal positions like a clock face, especially because the rotor turns clockwise when viewed from the drive end.



# Seal



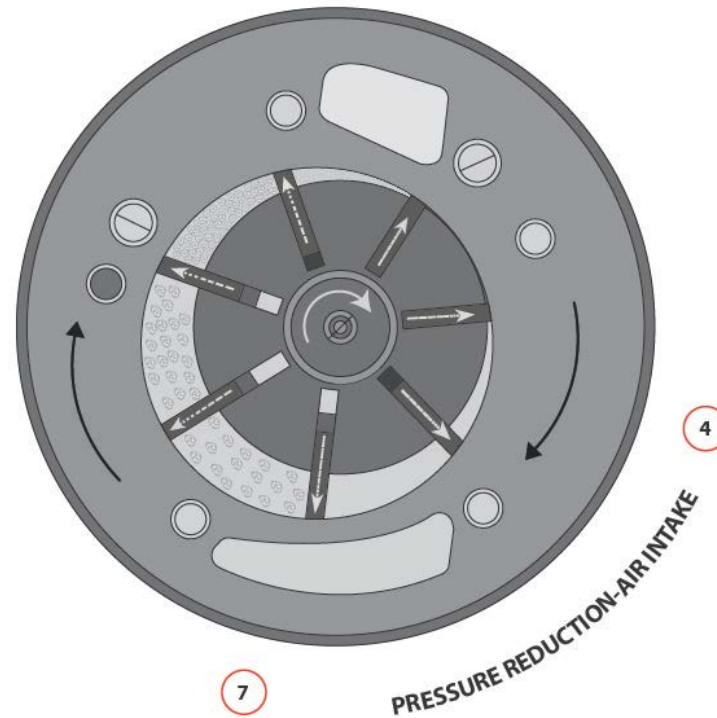
- Between 1 and 3 there is sealing between the rotor and the stator; this is actually the seal between high and low pressure.



# Air Inlet



- Between 4 and 7 the volume increases, creating an intake vacuum and allowing air to enter.

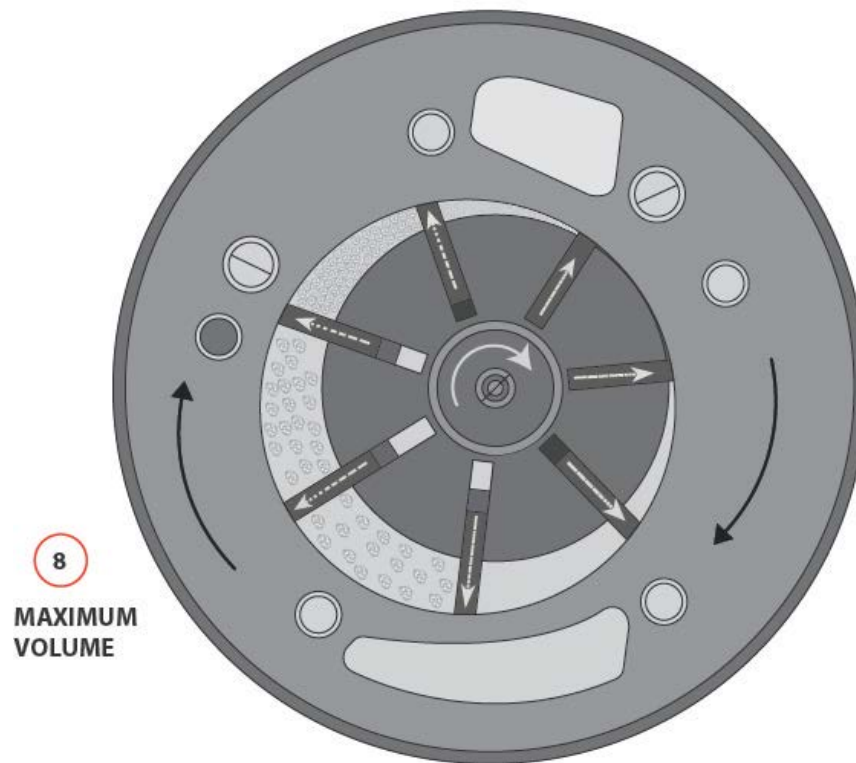




# Air Inlet



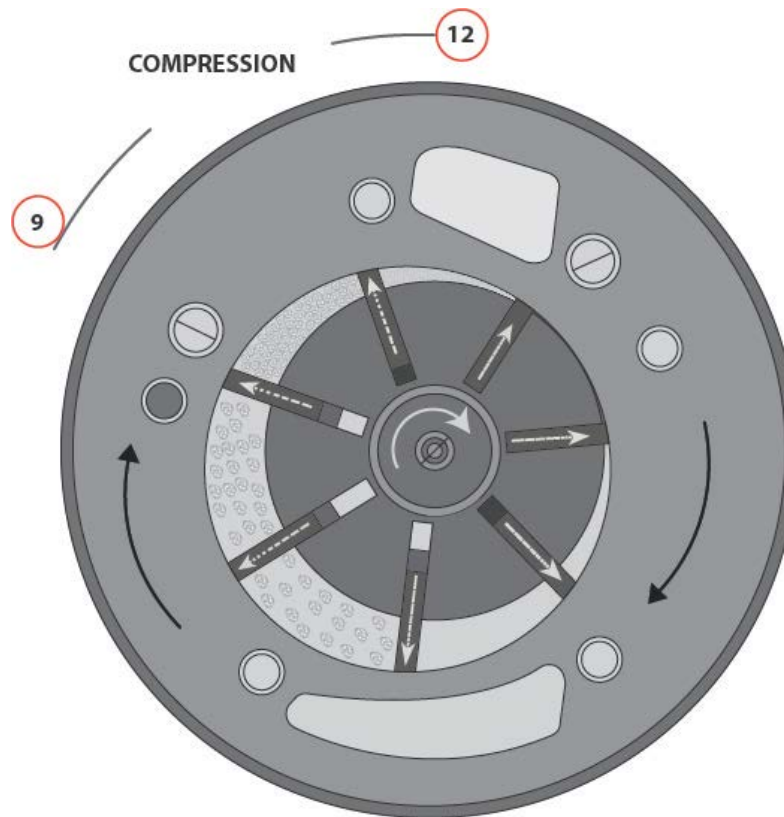
 In 8 the volume of air is at its highest point.



# Compression



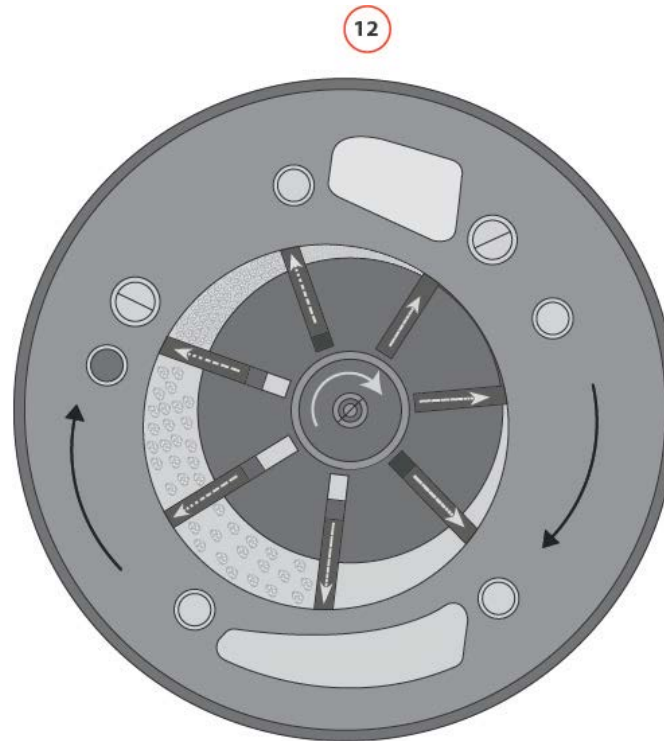
- From 9 to 12 the volume decreases by compressing the air; initially this happens rather slowly.



# Compression



- Ⓜ Near 12 the pressure increases very quickly, until compressed air is pushed into the stator delivery duct.




# Air Flow



- ① The air is drawn into the compressor through a filter retaining the impurities.
- ② Passing through the intake valve, the filtered air enters the rotor-stator unit to be compressed.
- ③ After the compression a first mechanical separation removes oil from the air, and then through separator filters
- ④ The compressed air leaves the compressor through a minimum pressure and non return valve.

# Lubrication – Oil Functions

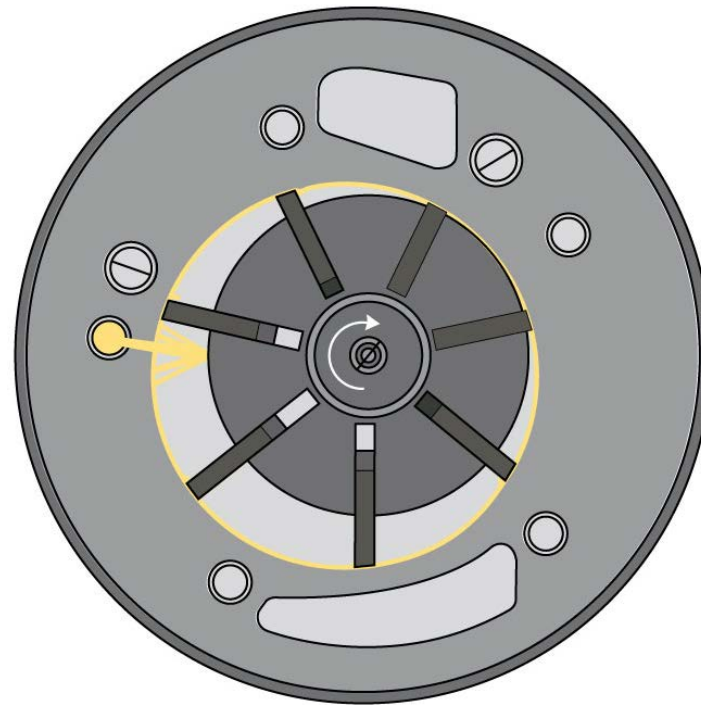


-  The oil performs some essential functions:
- Lubrication, by creating a film preventing direct contact
  - Cooling, by removing the heat produced by the compression
  - Sealing, by containing the internal leaks to the minimum
  - Control, through the control systems
  - Protection, by protecting the internal parts from corrosion
  - Filtering and washing, by aggregating the particles contained in the air drawn in.

# Oil Injection



 The oil is injected under pressure through proper injectors.



# Oil Separation



- Ⓜ The oil injected into the compression chamber, entrained by the compressed air, is separated in a proper separator.
- Ⓜ All series of Mattei compressors have their own system to separate oil from the compressed air.
- Ⓜ Description of the same can be found in the presentations of the single series.

# For further information:



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