

Mechanical seals for sorters

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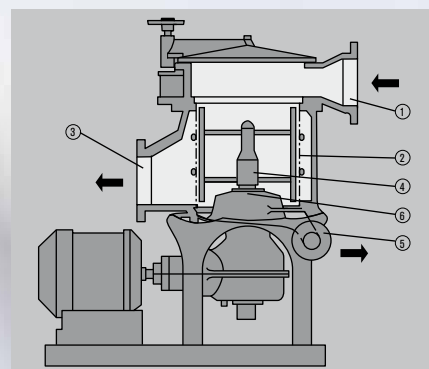
Voith slot screens in a recycled fibre plant used to manufacture standard and upgraded paper for newspapers.

Various types of sorters (screens) are used widely in the manufacturing of pulp and paper. They are used to remove contaminants such as splinters, knots, suspended particles, broken fragments of wood etc. from the pulp suspension. The yield of long-fiber material must be as high as possible from the process. Different fiber qualities can also be sorted.

Cylindrical Screens, also known as vertical screens, centri-screens and selectifiers, predominantly operate under pressure in order to achieve a higher yield of acceptable fibres.

Functional principle

A screen basket (2) with holes or slots is located in a pressure-resistant housing. A rotor (4) with smooth, stream-lined, vanes rotates very closely to the screen basket. The material is directed to the inside of the basket laterally at the top at (1). The vanes cause the material to pulsate, thereby preventing blockages. The material flows through the screen basket and is discharged laterally at the bottom from the housing (3). Foreign material is continuously extracted from the basket at (5) and fed to a vibration sorter or a final sorter. The mechanical seal (6) is installed vertically on the shaft under the screen basket, which clamps it in place on the shaft.



Schematic diagram of a cylindrical screen

- 1 Inlet
- 2 Screen basket
- 3 Accept
- 4 Rotor
- 5 Reject
- 6 Position of the mechanical seal



EagleBurgmann HR Cartridge seal



EagleBurgmann LP-D Cartridge seal

Seal requirements

The vertical installation of mechanical seals requires specific design features.

For single seals with a flush, the faces have to be lubricated all the time. The sorting machine must not be started before the flushing system is switched on. A cup integrated into the seal housing collects flushing water even before the machine is started up, thus preventing the mechanical seal from running dry. Depending on the size of the machine, the flushing rate is 3-5 liters of water per minute.

For double mechanical seals, the sealing gaps are lubricated with pressurized buffer water. A recirculation sleeve ensures that the sliding faces on the product side are lubricated with buffer water before the machine starts up and the sorting machine is filled with medium. Since this solution only allows clean buffer water to get between the sliding faces, the wear rate is significantly reduced.

The medium, comprising cellulose fibers, pigments, fillers, water and any contaminants which are present, is highly abrasive. Silicon carbide (SiC) is used as a sliding material to prevent premature wear. The springs are stationary and protected against the product. As a result, spring fatigue is avoided through any shaft misalignment, and fibers cannot clog the springs and stop them from working properly.

Operating conditions

Medium: Paper stock (up to 4 % max.) and water
 Pressure: p_1 ... 12 bar
 Temperature: t_1 ... 80 °C
 D_w : 50 ... 175 mm
 Speed: 1500 ... 250 rpm
 Axial movement of the shaft: ± 1 mm
 Installation: mostly vertical
 Materials: QQVGG or QQEGG

EagleBurgmann solutions for sorters

The single and double cartridge-type seal series - Cartex, HR and LP (for Andritz sorters) - have successfully proved themselves in many applications and can be adapted to any machine type. For many years, EagleBurgmann has been supplying mechanical seals to the leading manufacturers of sorting machines worldwide, including Voith Paper, Ravensburg (Germany), Andritz Oy Savolinna (Finland), Metso (Finland) and others.

HR and Cartex® single seals

With connection for flushing into the product. Only a flushing water connection is needed for operation of these seals. This connection is already provided e.g. after conversion from a braided packing to a mechanical seal.

HR and Cartex® double seals

With recirculation sleeve for accurately guided buffer water in vertical installations. Buffer pressure is required. We recommend operation of the seal with a supply system, e.g. EagleBurgmann TS 1016, which means no additional consumption of buffer fluid. The buffer pressure must be at least 2 bar above the highest product pressure that needs to be sealed. Alternatively, the buffer fluid can be provided from the local water supply with flow through and flow limitation via a supply unit with or without alarm (EagleBurgmann FLC200 or FLC100). Advantage: reduced and regulated consumption of buffer fluid.

LP-D double seals

As a sealing solution for Andritz sorters. Shrink-fitted seal faces ensure good torque transmission. Operation is the same as the HR double seals, or can also be alternatively used in Non-Flow operation (internal circulation of the buffer fluid) as a supplement to operation with EagleBurgmann FLC200 oder FLC100. Advantage: No additional consumption of buffer water. Due to our long-standing business activities in Finland, the LP design has become standard for the Finnish market.