Disc Filter
Boozer
Rotary Vacuum Filters of BOKELA

The continuous operation, the high performance capacity and the low space demand make rotary filters the most economical solution for a wide range of solid-liquid separation tasks.

Disc Filter Boozer Drum Filter Pan Filter

BOKELA disc, drum and pan filters define a new state of the art in rotary filter technology and surprise with numerous innovations. The superior process and mechanical design result in:

- high hydraulic capacity
- minimal pressure loss
- high filter speed
- homogenous cake thickness
- 100 % cake discharge
- extraordinary high throughput capacity
- advanced process control system
- safe operation and high flexibility

The Boozer

New Generation of Vacuum Rotary Disc Filters

When the first BOKELA disc filter of new design was commissioned, our customer was deeply impressed by the enormous filtration capacity. The large volume of filtrate the new disc filter was able to “drink” reminded them of the capability of some people drinking beer in the pub. Spontaneously, they called our disc filter a Boozer.

The Boozer represents a new generation of vacuum rotary disc filters

The innovative filter design of the Boozer results in superior performance and operation characteristics that set a new standard for rotary disc filters. Impressive characteristics like the

- high performance capacity by high filter speed of up to 6 rpm
- large filter area per footprint of 7,5 m²
- safe & economical operation
- easy maintenance

make the Boozer a superior technical and economical solution for filtration tasks, especially for applications with large slurry volumes.
Application Areas
Different Types for Different Applications

To meet the requirements of different applications and product characteristics the Boozer is available with
- special designs like internal or exchangeable external filtrate pipes for abrasive products
- a wide range of filter sizes differing in disc diameter and number of filter discs.

<table>
<thead>
<tr>
<th>Filter Type*</th>
<th>Typical Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>L, M, ME**</td>
<td>alumina (fine seed, coarse seed, blend seed), coal, iron ore, copper, zinc, lead</td>
</tr>
<tr>
<td>S, XS</td>
<td>chemical, food, life science industry</td>
</tr>
</tbody>
</table>

* L, M, S and XS refer to different disc diameters.
** Internal filtrate pipes (I), exchangeable filtrate pipes (E)

Innovative and Intelligent Answers to Today´s Filter Challenges

The design of the Boozer is the result of a systematic innovation. BOKELA designed a disc filter with excellent hydraulic performance.

The Boozer is characterized by
- low pressure drops lead to 100 % higher pressure difference at the filter cloth compared to conventional disc filters
- double capacity compared to conventional disc filters
- high filter speed of up to 6 rpm (conventional disc filters: max. 3 rpm)
- 100 % cake discharge even at high filter speed
- high operational reliability and flexibility
- fully automatic operation
- easy maintenance
Homogeneous Cake Formation and 100% Cake Discharge

Thanks to the outstanding hydraulic system the pressure loss over the entire section from the segments to the filtrate receiver is minimal. The result is a fast and unhindered filtrate drain.

The filter cake is homogeneous and of even thickness over the whole segment and at all discs due to:
- large number of up to 30 segments per disc leading to small sized segments
- 50 % submergence of the disc into the slurry
- slurry feeding at the side where vacuum starts.

These characteristics are the preconditions for:
- the intensive and uniform cake dewatering
- the low gas throughput
- the complete cake discharge
- cake discharge without re-wetting since no filtrate is blown back.

Outstanding Performance

Conventional filters fail performance because of:
- unsatisfying hydraulic capacity
- incomplete cake discharge
- weak segment fixing

\[
M_s = m_s \cdot A_F = \rho_s (1 - \varepsilon) \cdot \frac{2}{\eta L \gamma} \cdot \sqrt{\kappa} \cdot \sqrt{\Delta p} \cdot \sqrt{n} \cdot \frac{\alpha_t}{360 \cdot 60} \cdot A_F \cdot 3,600
\]
Main Components of the Boozer

1. Filter segments
2. Centre barrel
3. Control head
4. Filter trough
5. Snap blow valve
6. Drive unit

Main Component – Filter Segments
Easy Handling of Light Weight Segments

Each filter disc consists of up to 30 small sized and light filter segments which are mounted onto the centre barrel.

The Boozer segments provide
- optimal hydraulic conditions by zero-resistance design
  ➢ fast filtrate drainage and cake discharge in less than 0.2 sec.
- high stability of the filter disc
  ➢ self fixing and sealing metal bayonet
  ➢ channel rings make discs extra robust
- low cost for filter bags
- easy handling
  ➢ the light weight segments of < 20 kg make servicing easy.
Main Component – Filter Segments
Excellent Filtrate Clarity due to Tight Filter Bags

The filter bags are designed to meet today’s filter demands
- tough, resistant to tearing and well sealed
  - this leads to excellent filtrate clarity.
- fast and simple fixing with cable ties

The specially designed segment bell provides
- smooth and tight fit of filter bags
- easy mounting of filter bags.

Main Component – Centre Barrel
External and Internal Filtrate Piping

External filtrate pipes:
- for high abrasive products
- are easy to exchange
- ensure an easy maintenance
- have a trapezoidal design

Internal filtrate pipes:
- for non-abrasive products
- prevent a built up on the barrel surface
- excellent sealing
Main Component – Control Head
High-Performance Control Head Pre-Separates Filtrate and Air

The pressure loss of a two phase flow is up to 10 times higher than of a single phase flow. Therefore, the Boozer control head is designed to pre-separate the incoming filtrate/air mixture into a gas and liquor flow. Entrainment of filtrate from the cake formation zone into the dewatering zone is prevented even at high filter speed.

Main Component – Filter Trough
No Agitator and 50% Submergence Level

Main advantages of the Boozer trough design
- no agitator since the stirring effect of the discs homogenizes the slurry
- level control operation without steady slurry overflow
- 50% submergence of disc
- common and large sized overflow
- ability to handle variable feed flow rates

Boozer M-type trough (in the workshop)
Main Component – Filter Trough
Joint Single Trough Design for the Boozer L-Type

The joint single trough design of the Boozer L-type is an innovative trough design for the special requirements of large diameter disc filters.

- single compartments ensure slurry homogenisation by the rotating discs i.e. no agitator required
- common and large sized overflow:
  - even slurry level and an even cake thickness on all discs
  - level control operation
- 50% submergence of disc

Main Component – Snap Blow Valve
Complete Cake Discharge by Quick Blowback Impulse

In contrast to conventional design where blow back air is blowing steadily, the Boozer snap blow valve provides for an exactly timed, quick blowback:

- complete cake discharge with only 0.25 – 0.35 bar overpressure due to quick blowback impulse
- discharge of thin filter cakes of 4 – 5 mm
- electronic adjustment of the precise timing for the compressed air blowback

- complete cake discharge at all discs even at high filter speed
- no re-wetting of the filter cake
Main Component – Drive Unit
Designed for High Rotary Speeds up to 6 rpm

An excellent drive unit is needed to fulfill the demands placed on today’s rotary vacuum disc filters. The powerful drive units of the Boozer enable a filter operation
- with high filter speed of 6 rpm to enable full automatic control
- with thick filter cakes of 75 mm

Control Philosophy of the Boozer
Only a controlled operation is a safe operation

Flexible and safe operation in case of changing feed conditions by adaptation of the filter performance
- control of slurry level by adaptation of filter speed
- fully automatic operation instead of visual control by the operators
- no continuous overflow thanks to level control for speed regulation
- simple control circuits, easy to understand
Easy Maintenance
Fast and Simple Servicing of the Boozer

- no agitator
- easy access by permanent walk-ways
- light weight segments < 20kg
- easy exchange of segments because of bayonet-fixing
- smooth handling of cloth exchange
- cloth wash system with removable wash bars
- maintenance-free barrel sealing

BOKELA Disc Filter Boozer - Sizing

<table>
<thead>
<tr>
<th>Filter Type</th>
<th>XS</th>
<th>S</th>
<th>ME</th>
<th>MI</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disc Diameter [m]</td>
<td>2.2</td>
<td>3.2</td>
<td>4.1</td>
<td>3.9</td>
<td>5.6</td>
</tr>
<tr>
<td>Filtration Area [m²]</td>
<td>12 – 36 (72)*</td>
<td>30 – 90 (180)*</td>
<td>44 – 132 (264)*</td>
<td>40 - 60</td>
<td>88 – 176</td>
</tr>
<tr>
<td>Number of Discs per Control Head [-]</td>
<td>2 - 6</td>
<td>2 - 6</td>
<td>2 – 6</td>
<td>2 - 3</td>
<td>2 – 4</td>
</tr>
<tr>
<td>Number of Control Heads per Filter [-]</td>
<td>1 - 2</td>
<td>1 - 2</td>
<td>1 - 2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Number of Segments per Disc [-]</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Filtrate Pipe Design [-]</td>
<td>internal</td>
<td>internal</td>
<td>external</td>
<td>internal</td>
<td>internal</td>
</tr>
<tr>
<td>Trough Design [-]</td>
<td>common / twin**</td>
<td>common / twin**</td>
<td>common / twin**</td>
<td>common</td>
<td>joint single</td>
</tr>
<tr>
<td>Weight of segments [kg]</td>
<td>7</td>
<td>11</td>
<td>19.9</td>
<td>19.9</td>
<td>20</td>
</tr>
</tbody>
</table>

* maximum filter area with 2 control valves
** 2 separate troughs in case of 2 control valves (twin design)