



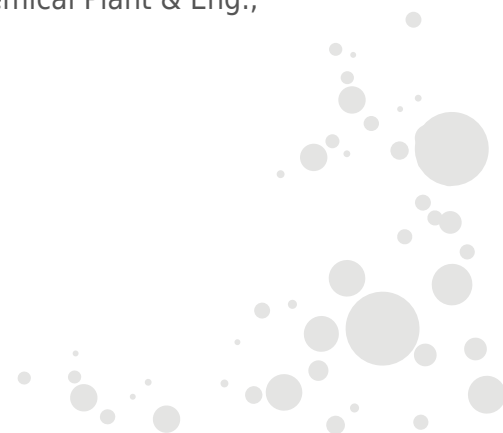
Bokela Revamping Disc Filter Header

FILTER REVAMPING

Optimization & upgrading of operating disc, drum & pan filters

REFERENCES

FILTER TYPE	OEM
vacuum disc filter	EIMCO, Dorr Oliver, KHD, Krauss Maffei, Thune, Denver
vacuum pan filter	EIMCO, Dorr Oliver
vacuum drum filter	EIMCO, Dorr Oliver, KHD, Krauss Maffei, Bird Young, Jord, Envirotech, Chemical Plant & Eng., Nivoba, BHS, Amafilter



PRODUCTS

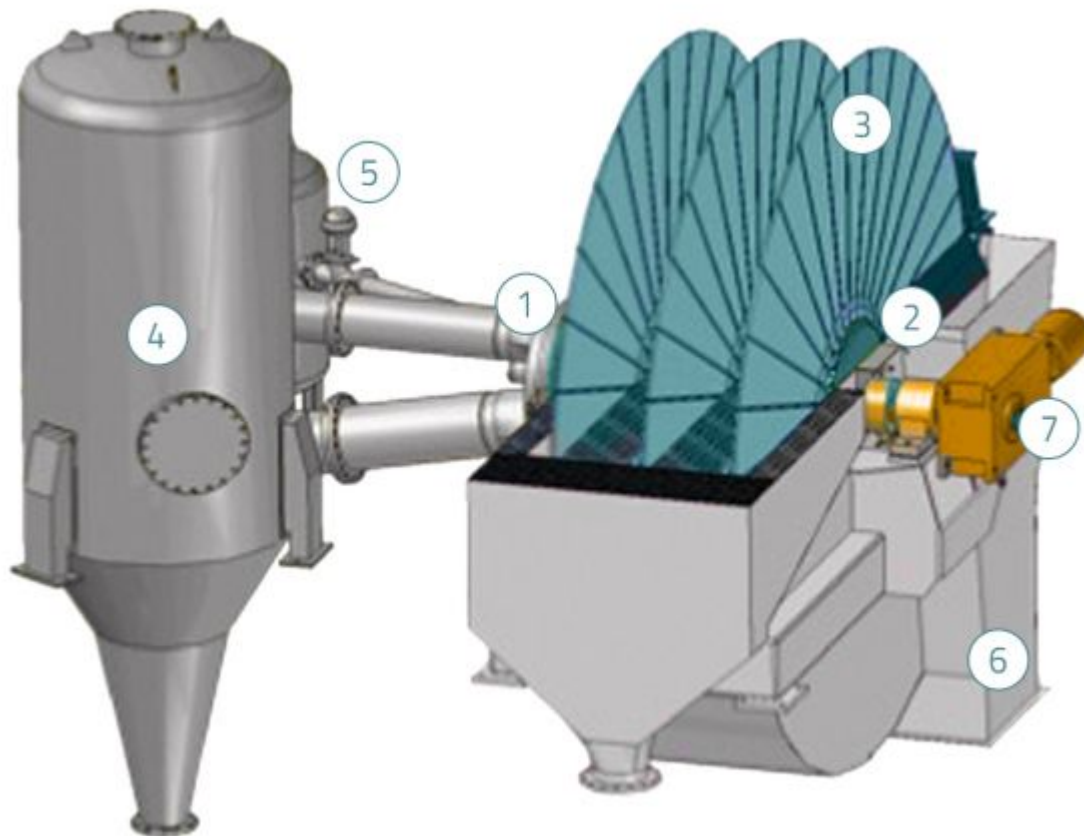
- Al-Hydrate (fine & coarse seed, product)
- coal
- base metal concentrates
- iron ore concentrate
- tailings
- potash
- sodium chloride
- sodium bicarbonate
- terephthalic acid
- pigments
- and many others

EXAMPLE: DISC FILTER REVAMPING

Depending on your target and available funds, a filter revamp can be carried out from a smaller up to a larger package of modifications.

	Large Package	Small Package
Modified components	1 Control head	1 Control head
	2 Filtrate pipes / shaft	2 -
	3 Segments	3 -
	4 -	4 -
	5 blow air tank & snap-blow valve	5 blow air tank & snap-blow valve
	6 Feeding / agitation	6 Feeding / agitation
	7 Filter drive	7 -
Solids capacity increase	60-150 %	20-40 %
Costs compared to investment for a new filter	15-25 %	5-10 %





Components of a disc filter relevant for revamping

ECONOMY OF FILTER REVAMPS

The costs of a filter revamping range from 25 % to 75 % of the price for a new filter. However, it has to be taken into account that the total costs of a new filter investment requires 3 to 4 times the price of the new filter itself due to the additional costs for building, piping, electrics, auxiliary services and engineering.

COST COMPARISON - REVAMPING VS NEW INVEST		
Modifications	Cost for revamping related to purchase of new filter	Cost for revamping related to costs for new filter incl. building, installation and commissioning
Small Package	25 %	approx. 10 %

Large Package

75 %

20-30 %

EXAMPLE: REVAMPING OF 5 DISC FILTERS IN AN ALUMINA REFINERY

In an Alumina refinery five disc filters are operated for Al-hydrate seed filtration. Due to a planned increase in production, the filter capacity needed to be increased by 40 %. This corresponded to an additional capacity of two new disc filters of the same type. Instead of installing two new filters, the customer engaged BOKELA to optimize the five existing disc filters with the target to achieve 40% increase in solids throughput.

COSTS FOR REVAMPING

Engineering by BOKELA	17 %
Optimization of 4 filters with a small package	32 %
Optimization of 1 filter with a large package	29 %
Additional costs for modification at customer installation	22 %
Total cost for revamping	100 %

The necessary increase in performance has been achieved by optimizing four disc filters with a small optimization package and 1 filter with a large optimization package of modifications. The costs for this optimization were only 23 % compared to the total costs for installation of 2 new filters.



COSTS FOR NEW FILTER INSTALLATION*

2 new filters	150 %
Building, piping, auxiliary units & engineering	280 %
Total cost for new invest	430 %

* related to total cost for revamping which is set to 100 %

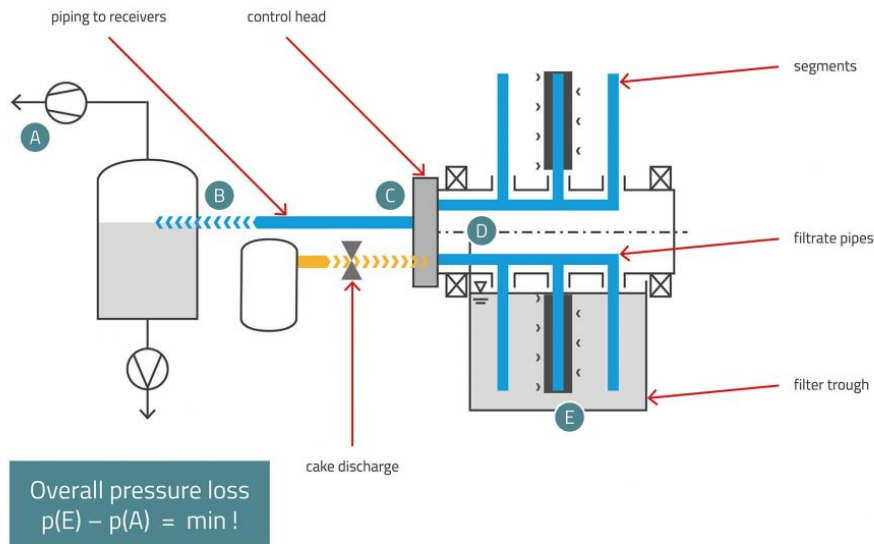
REVAMPING POTENTIAL

The aim of a filter revamp is to improve the filter performance in terms of throughput and residual moisture, to solve operating and maintenance problems, to reduce maintenance and operating costs, and to increase availability and operational reliability. In order to exploit the existing potential, all relevant filter components and auxiliary equipment are analyzed. Depending on the objective, most of the filter components can be converted so that they correspond to the latest BOKELA design.

Most of these modifications are made to address capacity and performance issues related to hardware bottlenecks and poor hardware design which results in high vacuum loss.

At the same time, the main problems for the operation and maintenance of the filters are eliminated, such as high wear on many components, poor lubrication, poor access for work during filter operation or for maintenance work.





NEW INVEST MEANS ...

- a lengthy pre-planning phase
- technology and market research (screening)
- OEM research
- complex engineering (new filter systems usually require a new building with new piping, cabling, auxiliary units ...)
- acceptance problems by operating personnel, since new & unknown equipment
- etc.

FILTER REVAMPING MEANS ...

- reduced planning and engineering efforts

- short-termed, fast realisation (plug & play)
- use of customer's own know-how and plant technologies
- use of the well known and operator-accepted equipment
- minimal costs for peripheral & supplementary equipment

THE ECONOMIC WAY TO GET OLD FILTERS BACK ON TRACK – STEP BY STEP

Assessment of the improvement potential through BOKELA expert

BOKELA offer for the appropriate revamp package to meet customers requirement

Order placed by customer

Engineering and manufacturing of optimization package

Delivery of optimization package

Installation of optimization package



Re-commissioning of optimized filter(s)

Performance test to verify customer's requirements are met



DISC FILTER REVAMPING

CAKE DISCHARGE BEFORE ...



Cake discharge BEFORE revamping

... AND AFTER REVAMPING FROM BOKELA





Cake discharge AFTER revamping



DRUM FILTER REVAMPING

CAKE DISCHARGE BEFORE ...



Drum filter cake discharge BEFORE revamping

... AND AFTER REVAMPING FROM BOKELA





Drum filter cake discharge AFTER revamping



PAN FILTER REVAMPING

CAKE WASH BEFORE ...



Cake wash on a pan filter BEFORE filter revamping

... AND AFTER REVAMPING FROM BOKELA





Cake wash on a pan filter AFTER filter revamping

