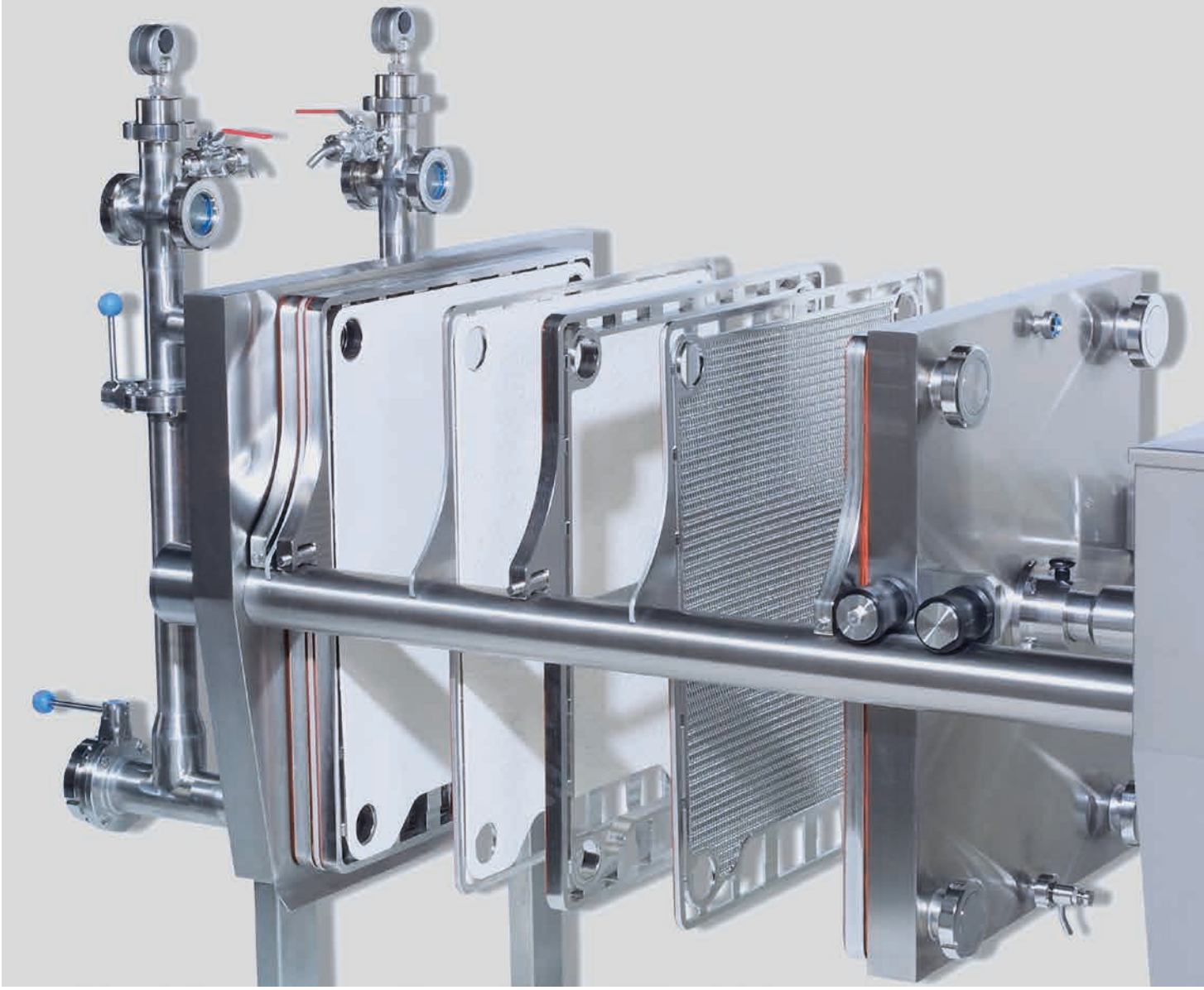
Filtration Products

BECO INTEGRA PLATE
enclosed plate and frame filter

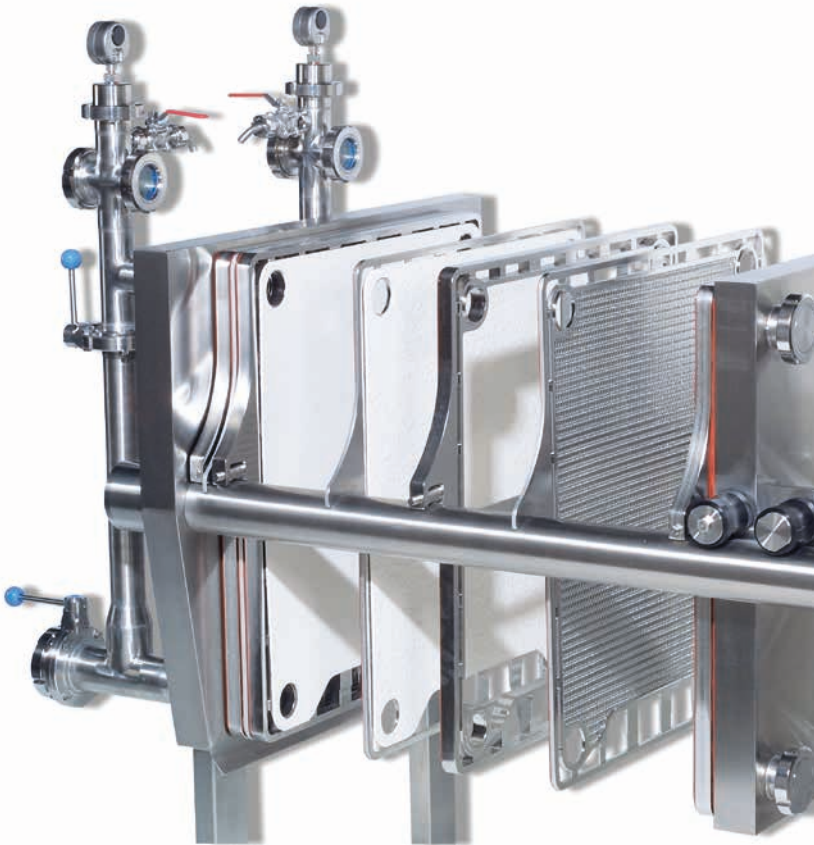


Powering Business Worldwide

Eaton, supplier of depth filtration solutions, develops, manufactures, and provides top-quality depth filter media for a wide range of applications including food and beverage industries, fine and specialty chemicals, cosmetics, pharmaceutical industries, as well as in biotechnology. Eaton offers a variety of equipment and system solutions for the use of BECO® depth filter media.

With the BECO INTEGRA® PLATE for chemical and pharmaceutical applications, Eaton offers an enclosed depth filtration system that optimally manages the demanding filtration tasks and guarantees safe process control.

Our quality policy aims to produce and provide products and services of consistent, highest-level quality. Our equipment and system solutions meet national and international standards, guidelines and applicable laws such as cGMP, FDA, EC, VDI and internal customer-specific regulations.



Concept

BECO INTEGRA PLATE enclosed depth filtration systems consist of a filter chassis with hydraulic compression and a filter pack. The filter pack is made up of individual elements (optionally stainless steel or plastic). Depending on the filtration requirements, BECO depth filter sheets are designed for coarse filtration to microbe removal. The BECO INTEGRA PLATE enclosed depth filtration system can optionally be used for cake filtration, sheet filtration or step filtration.

Five sizes are available:

- BECO INTEGRA PLATE A200 filter elements 200 x 200 mm in PP or PVDF available only
- BECO INTEGRA PLATE A400 filter elements 400 x 400 mm
- BECO INTEGRA PLATE A600 filter elements 600 x 600 mm
- BECO INTEGRA PLATE A800 filter elements 800 x 800 mm in PP or PVDF available only
- BECO INTEGRA PLATE A1000 filter elements 1000 x 1000 mm in PP or PVDF available only

Filter types

1. Filter elements made from stainless steel with external chamber and circumferential gasket
   BECO INTEGRA PLATE A400 EC
   BECO INTEGRA PLATE A600 EC

2. Filter elements made from stainless steel with circumferential O-ring gasket
   BECO INTEGRA PLATE A400 DC
   BECO INTEGRA PLATE A600 DC

3. Filter elements made from plastic with external chamber and circumferential O-ring gasket
   BECO INTEGRA PLATE A200 EP
   BECO INTEGRA PLATE A400 EP
   BECO INTEGRA PLATE A600 EP
   BECO INTEGRA PLATE A800 EP
   BECO INTEGRA PLATE A1000 EP

4. Filter elements made from plastic (polypropylene or PVDF) with circumferential O-ring gasket
   BECO INTEGRA PLATE A400 DP
   BECO INTEGRA PLATE A600 DP

5. Filter elements made of plastic with external chamber, without gaskets
   BECO INTEGRA PLATE A200 OEP
   BECO INTEGRA PLATE A400 OEP
   BECO INTEGRA PLATE A600 OEP
   BECO INTEGRA PLATE A800 OEP
   BECO INTEGRA PLATE A1000 OEP

Customized types are available upon request!

Benefits

Minimized product loss through
- high safety due to enclosed design
- specially designed filter elements allow for complete emptying

CIP/SIP capability
- the enclosed filter pack enables cleaning of the system without BECO depth filter sheets
- sterilization with BECO depth filter sheets
- no inaccessible corners or additional installation effort
- no dead spaces through special support of the BECO depth filter sheets
- easy to clean due to sanitary design of the filter elements
- cleaning validation possible on request (IQ/OQ)

High flexibility through
- different filter types
- five plate sizes 200 x 200, 400 x 400, 600 x 600, 800 x 800 and 1000 x 1000 mm
- cake frames with different widths for cake filtration and separation of high particle concentrations
- comprehensive range of types available for selecting the appropriate BECO depth filter sheet

Pioneering filtration through
- ideal flow distribution and product supply due to optimum design and configuration of the supply channels
- uniform cake structure ensured by optimum distribution of the material to be filtered
- proper airflow due to the special design of the product channels situated at the top
- good dry-blowing of the cake
- optimum support of the BECO depth filter sheet based on tubular grid or ribbed plate
- sealing of the product channels via the BECO depth filter sheet

Simple handling through
- placement and accurate positioning of the BECO depth filter sheet with the aid of the support noses/cams at the filter elements
- free cleaning of the filter (discharge of the BECO depth filter sheets and cakes downwards into a collecting tray)

Configuration filter pack

Depending on the filtration task, the filter pack is made up of feed plates, filtrate plates, or cake frames. BECO depth filter sheets are inserted between the filter elements and compressed.

For **sheet filtration**, a feed plate, a BECO depth filter sheet and a filtrate plate are used alternately.

For **cake filtration**, the filter pack consists of a combination of cake frame, filtrate plate, and an intermediate BECO depth filter sheet. The cake frame is used for holding the solids.

For **step filtration**, a baffle plate enables two-stage sheet filtration or primary precoat filtration followed by secondary sheet filtration.

The filter elements are designed to ensure secure insertion of the BECO depth filter sheet. Support rods below the filter pack are therefore not required.

The product channels of the filter elements are sealed via the BECO depth filter sheet; no additional gaskets are required. This ensures that only the filter element and the BECO depth filter sheet are in contact with the product.

The filter elements are manufactured following cGMP guidelines.

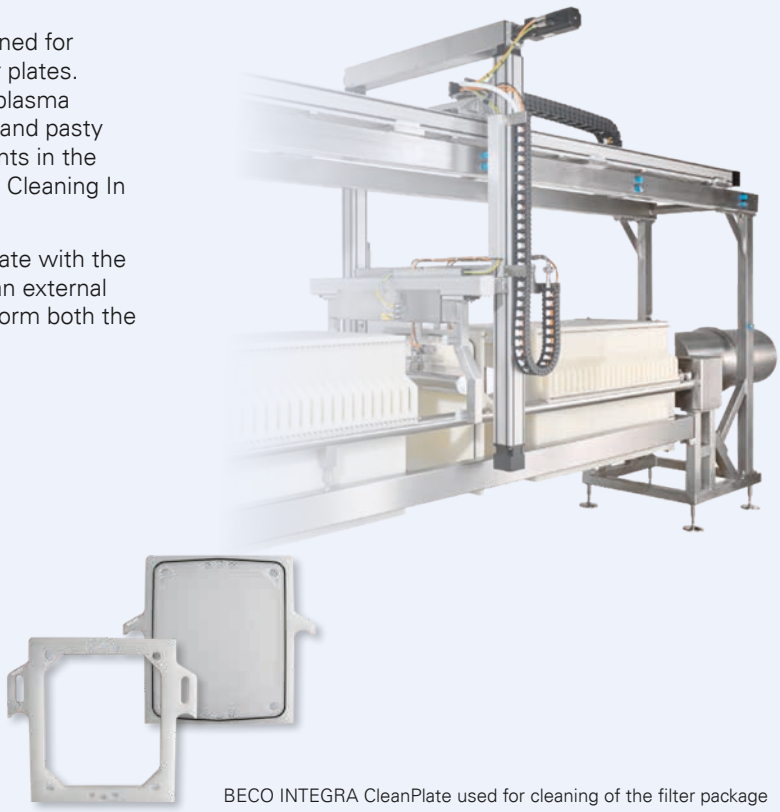
Cleaning of the Filter Elements

The BECO INTEGRA CleanPlate system is designed for the automated cleaning of cake frames and filter plates. This cleaning system is particularly beneficial in plasma fractionation after paste harvesting, where solid and pasty particles must be removed from the filter elements in the Cleaning Out of Place (COP) process prior to the Cleaning In Place (CIP) step.

The combination of the BECO INTEGRA CleanPlate with the BECO INTEGRA PLATE filter package featuring an external outer chamber, provides an ideal solution to perform both the COP and the CIP step in one single system.

Special features:

- Fully automated cleaning
- Reduced cleaning time
- Full traceability
- Documented cleaning process
- Reproducible cleaning times
- Self-flushing unit
- Fresh cleaning fluid for each filter element
- Developed for production scale
- Self-draining



BECO INTEGRA CleanPlate used for cleaning of the filter package

BECO INTEGRA PLATE EC	BECO INTEGRA PLATE DC	BECO INTEGRA PLATE EP BECO INTEGRA PLATE OEP	BECO INTEGRA PLATE DP
Filter elements With external chamber and circumferential gasket	**Filter elements** With circumferential O-ring gasket	**Filter elements** With external chamber and circumferential O-ring gasket (without gasket for OEP type)	**Filter elements** With circumferential O-ring gasket
External chamber • Optimum CIP/SIP of the filter pack • Separate application of inert gas to the external chamber for rinsing, heating, or cooling of the filter pack during the filtration • Application of different BECO depth filter sheet types		**External chamber** • Optimum CIP/SIP of the filter pack • Separate application of inert gas to the external chamber for rinsing or cooling of the filter pack during the filtration • Application of different BECO depth filter sheet types	
Specific features **Feed plates/Filtrate plate** • Optimum support of the BECO depth filter sheets (tubular grid) • Optimum distribution of the unfiltered liquid and filtrate, therefore optimum utilization of the filter area • Width: 8 mm • Support noses on one side of the upper product channels	**Specific features** **Feed plates/Filtrate plate** • Optimum support of the BECO depth filter sheets (tubular grid) • Optimum distribution of the unfiltered liquid and filtrate, therefore optimum utilization of the filter area • Width: 10 mm • Support noses on one side of the upper product channels	**Specific features** **Feed plates/Filtrate plate** • Optimum support of the BECO depth filter sheets (ribbed plate) • Good distribution of the unfiltered liquid and filtrate, therefore good utilization of the filter area • Width: 26 mm (28 mm) • Support pins on both sides of the upper product channels	**Specific features** **Feed plates/Filtrate plate** • Optimum support of the BECO depth filter sheets (ribbed plate) • Good distribution of the unfiltered liquid and filtrate, therefore good utilization of the filter area • Width: 25 mm • Support pins on both sides of the upper product channels
Cake frame • Frame width 8, 18, 25, or 40 mm • Support noses on one side of the upper product channels	**Cake frame** • Frame width 10, 18, 25, or 40 mm • Support noses on one side of the upper product channels	**Cake frame** • Frame width 20, 30, 40, or 60 mm • Support pins on both sides of the upper product channels	**Cake frame** • Frame width 20, 30, 40, or 60 mm • Support pins on both sides of the upper product channels
Material Stainless steel AISI 316L, electrolytically polished	**Material** Stainless steel AISI 316L, electrolytically polished	**Material** Plastic (polypropylene or PVDF, FDA listed)	**Material** Plastic (polypropylene or PVDF, FDA listed)
Gaskets Made of silicone, EPDM, viton	**Gaskets** O-ring gasket made of silicone, EPDM, viton, silicone/FEP coated	**Gaskets (for EP only)** O-ring gasket made of silicone, EPDM, viton	**Gaskets** O-ring gasket made of silicone, EPDM, viton

Filter Chassis

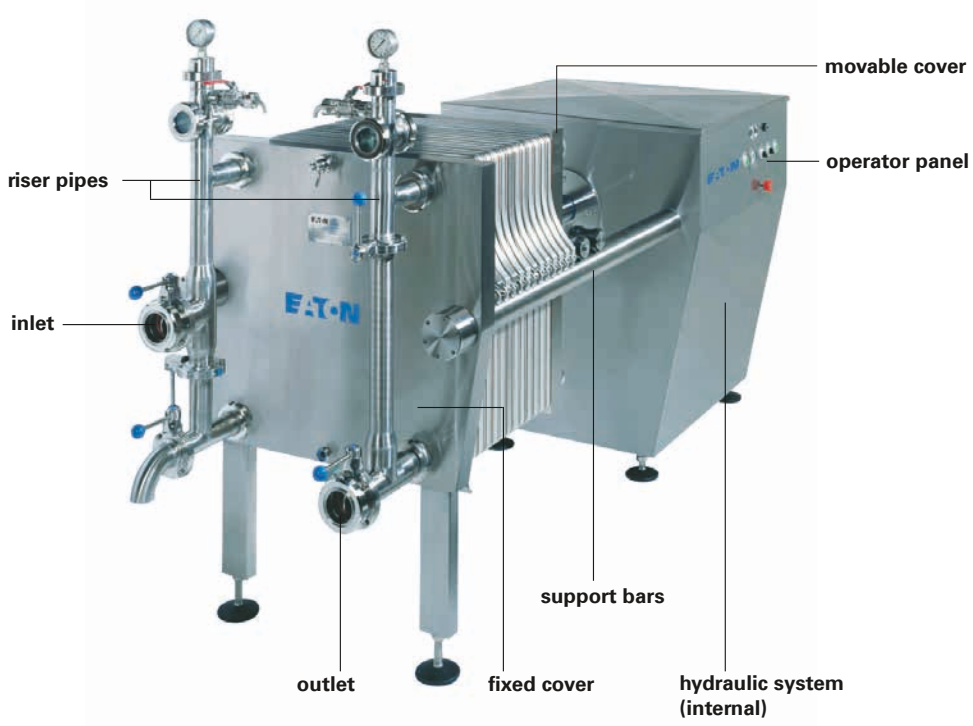
The filter chassis consists of a fixed front cover and two carrier bars that are connected to the cross member on the opposite side. The individual filter elements are hung on the carrier bars. Several elements and BECO depth filter sheets form the filter pack together with the fixed and movable cover.

System benefits

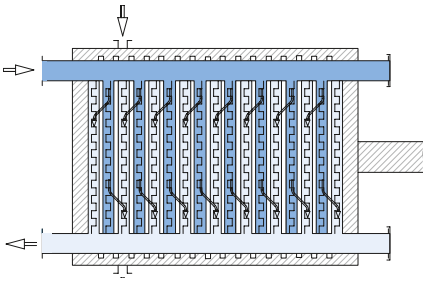
Flexible adaptation to the filtration task through
- three filter types
- different plate sizes
- different chassis sizes
- step filtration using a baffle plate

Highly safe operation through
- automatic hydraulic pressure regulation
- low closing speed – no additional safety devices are required
- optional safety pressure transmitters
- two-hand operation of the function switches
- defined contact pressure
- pilot-openable non-return valve (prevents the filter pack from opening under operating pressure)

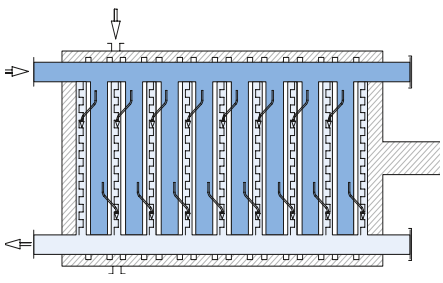
Simple handling and easy to clean through
- ergonomic design
- downwards cleaning into a collecting tray
- hanging support of the BECO depth filter sheet



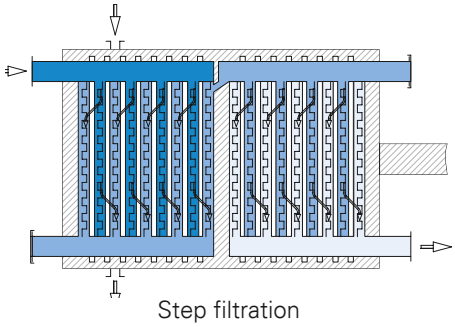
Operating Principles



Sheet filtration



Sheet filtration with wide cake frames



Step filtration

Technical Data

	BECO INTEGRA PLATE A400 EC	BECO INTEGRA PLATE A600 EC
Connections (round threaded connecting piece DIN 11851, flange DIN 2633, Tri-Clamp ISO 2852):		
• Inlet	DN 25	DN 65
• Outlet	DN 25	DN 65
• External chamber	DN 10	DN 15
Operating pressure	Max. 600 kPa/6 bar	Max. 600 kPa/6 bar
Differential pressure	Max. 400 kPa/4 bar	Max. 400 kPa/4 bar
Operating temperature	Max. 140°C	Max. 140°C
Materials:		
• Parts in contact with the product	AISI 316L	AISI 316L
• Other parts	AISI 304	AISI 304
• Gaskets	Silicone, EPDM, viton	Silicone, EPDM, viton
Filter area:		
• Sheet filtration	Max. 12 m^2	Max. 50 m^2
• Cake filtration	Max. 5.52 m^2 (40 mm cake frame)	Max. 21.33 m^2 (40 mm cake frame)
Effective filter area/filter element	0.12 m^2	0.33 m^2
Cake volume (usable)	Max. 98.9 l (40 mm cake frame)	Max. 373 l (40 mm cake frame)

	BECO INTEGRA PLATE A400 DC	BECO INTEGRA PLATE A600 DC
Connections (round threaded connecting piece DIN 11851, flange DIN 2633, Tri-Clamp ISO 2852):		
• Inlet	DN 25	DN 65
• Outlet	DN 25	DN 65
Operating pressure	Max. 600 kPa/6 bar	Max. 600 kPa/6 bar
Differential pressure	Max. 400 kPa/4 bar	Max. 400 kPa/4 bar
Operating temperature	Max. 140°C	Max. 140°C
Materials:		
• Parts in contact with the product	AISI 316L	AISI 316L
• Other parts	AISI 304	AISI 304
• Gaskets	Silicone, EPDM, viton, FEP coated	Silicone, EPDM, viton, FEP coated
Filter area:		
• Sheet filtration	Max. 12 m^2	Max. 48 m^2
• Cake filtration	Max. 5.52 m^2 (40 mm cake frame)	Max. 21.33 m^2 (40 mm cake frame)
Effective filter area/filter element	0.12 m^2	0.33 m^2
Cake volume (usable)	Max. 97 l (40 mm cake frame)	Max. 341 l (40 mm cake frame)

	BECO INTEGRA PLATE A200 EP/OEP	BECO INTEGRA PLATE A400 EP/OEP	BECO INTEGRA PLATE A600 EP/OEP	BECO INTEGRA PLATE A800 EP/OEP	BECO INTEGRA PLATE A1000 EP/OEP
Connections (Tri-Clamp ISO 2852/ASM BSP):					
• Inlet	¾"	1"	1 ½"	2"	2.5"
• Outlet	¾"	1"	1 ½"	2"	2.5"
• External chamber	½"	1"	1 ½"	2"	2.5"
Operating pressure	Max. 500 kPa/5 bar	Max. 500 kPa/5 bar	Max. 500 kPa/5 bar	Max. 500 kPa/5 bar	Max. 500 kPa/5 bar
Differential pressure	Max. 300 kPa/3 bar	Max. 300 kPa/3 bar	Max. 300 kPa/3 bar	Max. 300 kPa/3 bar	Max. 300 kPa/3 bar
Operating temperature	Max. 85°C at max. 100 kPa/1 bar	Max. 85°C at max. 100 kPa/1 bar	Max. 85°C at max. 100 kPa/1 bar	Max. 85°C at max. 100 kPa/1 bar	Max. 85°C at max. 100 kPa/1 bar
Materials:					
• Filter pack	PP (FDA listed)	PP (FDA listed)	PP (FDA listed)	PP (FDA listed)	PP (FDA listed)
• Parts in contact with the product	AISI 316L, PP	AISI 316L, PP	AISI 316L, PP	AISI 316L, PP	AISI 316L, PP
• Other parts	AISI 304	AISI 304	AISI 304	AISI 304	AISI 304
• Gaskets (EP only)	Silicone, EPDM, viton	Silicone, EPDM, viton	Silicone, EPDM, viton	Silicone, EPDM, viton	Silicone, EPDM, viton
Filter area:					
• Sheet filtration	Max. 0.728 m^2	Max. 6.38 m^2	Max. 27.00 m^2	Max. 66.00 m^2*	Max. 127.50 m^2*
• Cake filtration	Max. 0.672 m^2 (30 mm cake frame)	Max. 7.04 m^2 (20 mm cake frame)	Max. 22.68 m^2 (30 mm cake frame)	Max. 56.32 m^2* (30 mm cake frame)**	Max. 108.00 m^2* (30 mm cake frame)**
Effective filter area/filter element	0.028 m^2	0.11 m^2	0.27 m^2	0.44 m^2	0.75 m^2
Cake volume (usable)	Max. 12.3 l (60 mm cake frame)	Max. 88.55 l (40 mm cake frame)	Max. 415 l (60 mm cake frame)	Max. 1065 l (60 mm cake frame)	Max. 1627 l (40 mm cake frame)

	BECO INTEGRA PLATE 400 DP	BECO INTEGRA PLATE 600 DP
Connections (round threaded connecting piece DIN 11851, flange DIN 2633, Tri-Clamp ISO 2852):		
• Inlet	DN 25	DN 65
• Outlet	DN 25	DN 65
Operating pressure	Max. 500 kPa/5 bar at max. 40°C	Max. 500 kPa/5 bar at max. 40°C
Differential pressure	Max. 300 kPa/3 bar at max. 40°C	Max. 300 kPa/3 bar at max. 40°C
Operating temperature	Depending on material	Depending on material
Materials:		
• Filter pack	PP, PVDF	PP, PVDF
• Parts in contact with the product	AISI 316L, PP or PVDF	AISI 316L, PP or PVDF
• Other parts	AISI 304	AISI 304
• Gaskets	Silicone, EPDM, viton	Silicone, EPDM, viton
Filter area:		
• Sheet filtration	Max. 6.60 m^2	Max. 29.00 m^2
• Cake filtration	Max. 5.50 m^2 (30 mm cake frame)	Max. 22.68 m^2 (30 mm cake frame)
Effective filter area/filter element	0.11 m^2	0.29 m^2
Cake volume (usable)	Max. 102 l (60 mm cake frame)	Max. 448 l (60 mm cake frame)

* Bigger surface areas available on demand
** Different plates and frames thicknesses available on demand

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