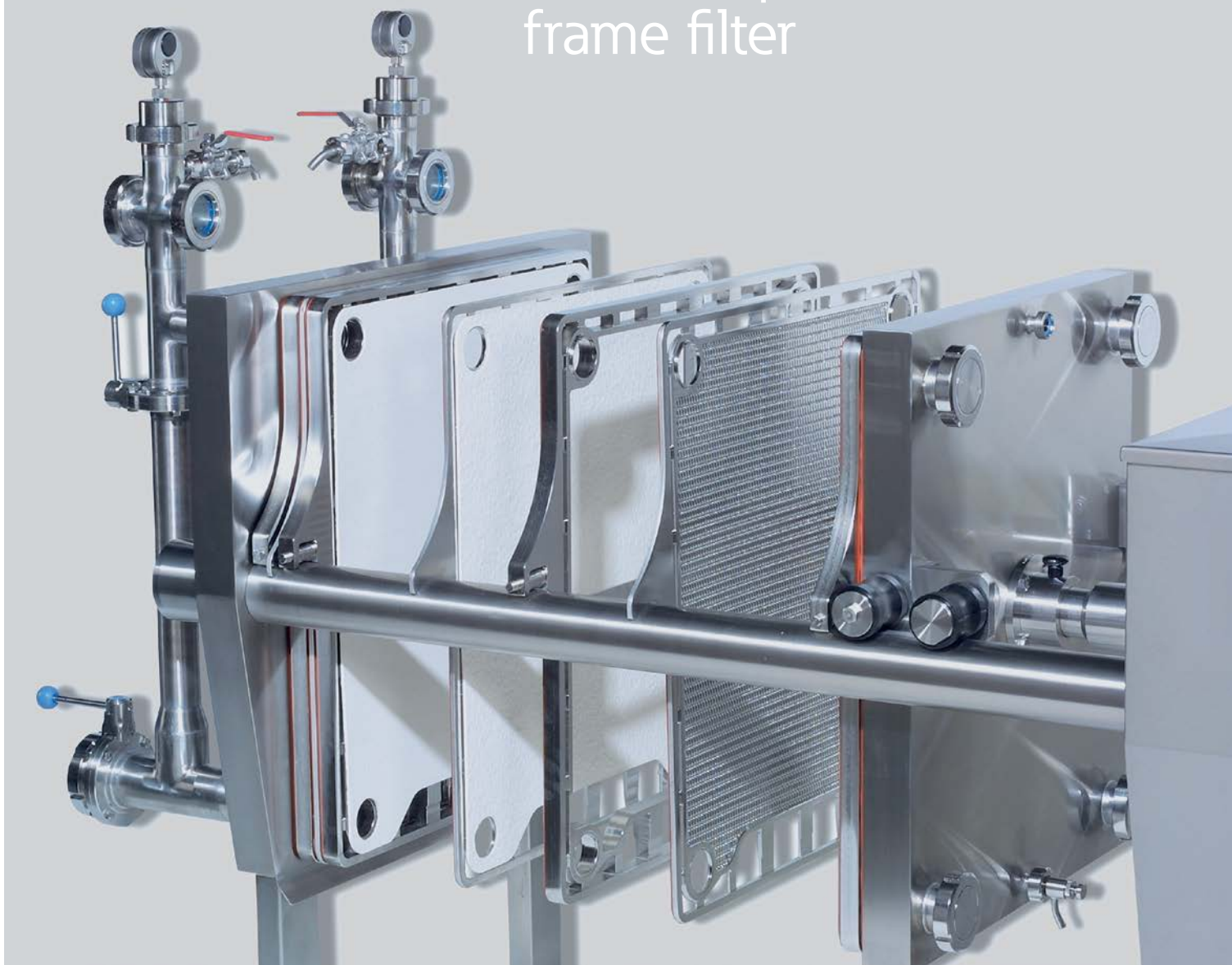


BECO INTEGRA PLATE enclosed plate and frame filter



EATON

Powering Business Worldwide

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

With BECO INTEGRA® PLATE for chemical and pharmaceutical application, Eaton offers enclosed depth filtration system that optimally deals with demanding filtration tasks and guarantees safe process control.



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 200 filter elements 7.9 x 7.9 in (200 x 200 mm) with PP or PVDF available only
- BECO INTEGRA PLATE 400 filter elements 15.7 x 15.7 in (400 x 400 mm)
- BECO INTEGRA PLATE 600 filter elements 23.6 x 23.6 in (600 x 600 mm)
- BECO INTEGRA PLATE 800 filter elements 31.5 x 31.5 in (800 x 800 mm) with PP or PVDF available only
- BECO INTEGRA PLATE 1000 filter elements 39.3 x 39.3 in (1000 x 1000 mm) with PP or PVDF available only

Filter types

1. Filter elements made from stainless steel with external chamber
BECO INTEGRA PLATE 400 EC
BECO INTEGRA PLATE 600 EC
2. Filter elements made from stainless steel with circumferential O-ring gasket
BECO INTEGRA PLATE 400 DC
BECO INTEGRA PLATE 600 DC
3. Filter elements made from plastic with external chamber
BECO INTEGRA PLATE 200 EP
BECO INTEGRA PLATE 400 EP
BECO INTEGRA PLATE 600 EP
BECO INTEGRA PLATE 800 EP
BECO INTEGRA PLATE 1000 EP
4. Filter elements made from plastic (polypropylene or PVDF) with circumferential O-ring gasket
BECO INTEGRA PLATE 400 DP
BECO INTEGRA PLATE 600 DP
5. Filter elements made of plastic with external chamber, without gaskets
BECO INTEGRA PLATE 200 OEP
BECO INTEGRA PLATE 400 OEP
BECO INTEGRA PLATE 600 OEP
BECO INTEGRA PLATE 800 OEP
BECO INTEGRA PLATE 1000 OEP

Customized types are available upon request!



Configuration

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.

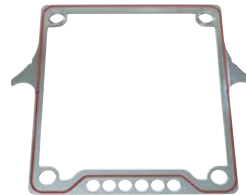
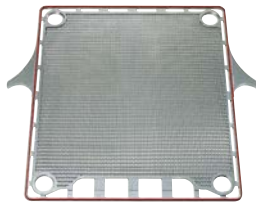
For **cake filtration**, the filter pack consists of a combination of cake frame, filtrate plate, and an intermediate BECO depth filter sheet. The cake frame is used for holding the solids.

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.



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

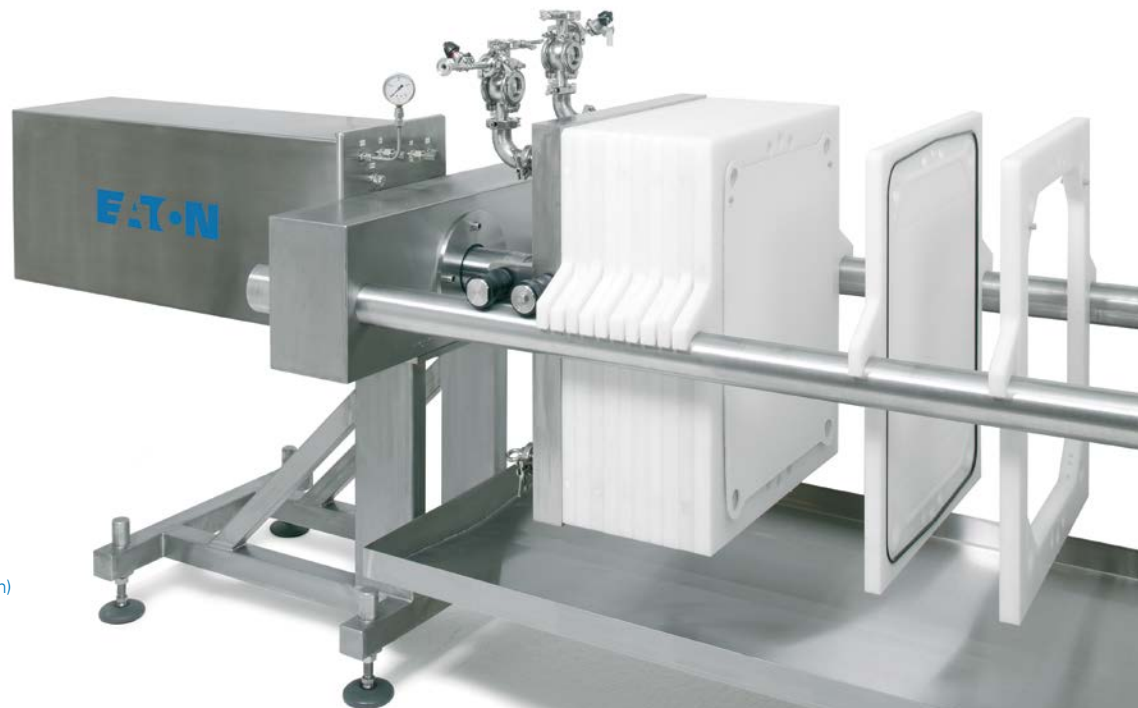
- different filter types
- five plate sizes 7.9 x 7.9, 15.7 x 15.7, 23.6 x 23.6, 31.5 x 31.5 and 39.3 x 39.3 in¹ (200 x 200, 400 x 400, 600 x 600, 800 x 800 and 1000 x 1000 mm¹)
- cake frames with different widths for cake filtration and separation of high particle concentrations
- comprehensive range 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)



¹ 7.9 x 7.9, 31.5 x 31.5 and 39.3 x 39.3 in (200 x 200, 800 x 800 and 1000 x 1000 mm) with PP or PVDF available only

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 <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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: 0.3 in (8 mm) • Support noses on one side of the upper product channels 	Specific features Feed plates/Filtrate plate <ul style="list-style-type: none"> • 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: 0.4 in (10 mm) • Support noses on one side of the upper product channels 	Specific features Feed plates/Filtrate plate <ul style="list-style-type: none"> • 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: 1.0 in (1.1 in) [26 mm (28 mm)] • Support pins on both sides of the upper product channels 	Specific features Feed plates/Filtrate plate <ul style="list-style-type: none"> • 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: 1.0 in (25 mm) • Support pins on both sides of the upper product channels
Cake frame <ul style="list-style-type: none"> • Frame width 0.3, 0.7, 1.0, or 1.6 in (8, 18, 25, or 40 mm) • Support noses on one side of the upper product channels 	Cake frame <ul style="list-style-type: none"> • Frame width 0.4, 0.7, 1.0, or 1.6 in (10, 18, 25, or 40 mm) • Support noses on one side of the upper product channels 	Cake frame <ul style="list-style-type: none"> • Frame width 0.8, 1.2, 1.6, or 2.4 in (20, 30, 40, or 60 mm) • Support pins on both sides of the upper product channels 	Cake frame <ul style="list-style-type: none"> • Frame width 0.8, 1.2, 1.6, or 2.4 in (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

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)

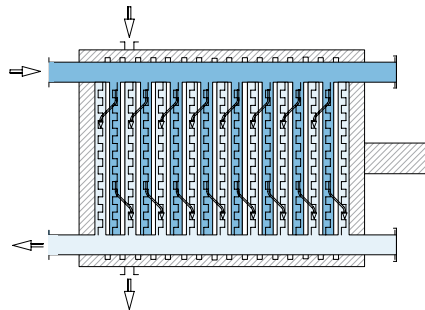
Simple handling and easy to clean through

- ergonomic design
- downwards cleaning into a collecting tray
- hanging support of the BECO depth filter sheet



Sheet filtration

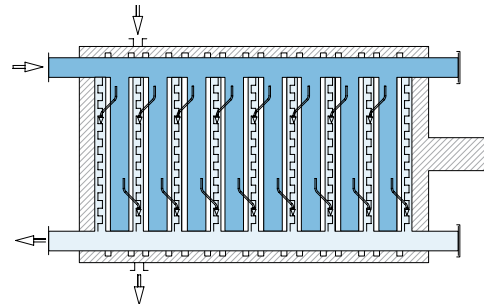
The material to be filtered is fed into two distribution channels of the filter pack via the riser. These distribute the liquid via openings into the feed plates/cake frames. The fluid to be filtered flows through the BECO depth filter sheet. Particles and colloids are separated. The filtrate is fed to the collection channels via the filtrate plates and flows to the filter outlet via the riser pipe.



Sheet filtration

Cake filtration

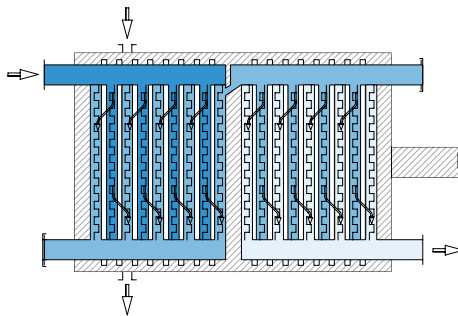
The unfiltered liquid with high particle concentration to be filtered is fed into the two distribution channels via the riser. These distribute the material to be filtered and the solids into the cake frames via the supply channels. Solids and liquid are separated by the depth filter medium. During the filtration cycle, the solids build up a cake at the BECO depth filter sheet. The liquid is clarified during this process. The filtrate is fed to the collection channels via the filtrate plates and flows to the filter outlet via the riser pipe.



Sheet filtration with wide cake frames

Step filtration (with baffle plate)

The baffle plate can be used to separate the filter into two areas. This enables two-stage sheet filtration or primary cake filtration followed by secondary sheet filtration.



Step filtration





BECO INTEGRA PLATE enclosed depth filtration system offers optimum benefits through the combination with BECO depth filter sheets.

The following product ranges are available for selecting the optimum depth filter medium for the filtration task at hand:

		BECO depth filter sheets
<i>In compliance with pharmaceutical processes</i>	Depth filter sheets with low endotoxin content for pharmaceutical applications	BECO PR range
	Mineral-free, high-purity depth filter medium for pharmaceutical applications	BECOPAD® P range
	Support sheets for cake filtration in the pharmaceutical industry	BECO PR ENDURA® BECO PR ENDURA S
	Depth filter sheets containing activated carbon	BECO ACF 07
	Depth filter sheets for standard applications	BECO standard range
	Mineral-free, high-purity, depth filter medium for industrial applications	BECOPAD range
	Depth filter sheets for filtration of highly viscous liquids	BECO CPS range
	Depth filter sheets for filtration of viscous liquids	BECO CP1
	Depth filter sheets with reduced Calcium and Magnesium content	BECO SELECT™ A range
	Support sheets for precoat filtration	BECO ENDURA

Eaton's range is complemented by our comprehensive service. Process specialists will provide support for the preparation of the requirement profile, its implementation in practice, the delivery documentation including IQ/OQ, and staff training.

Eaton's customers' final products are subject to very rigorous testing standards, precisely defined quality requirements, and a wide range of regulation compliance.

Some production processes have to be protected from external influences and validated according to the FDA or cGMP requirements. For other production processes, the emissions released by the product are of particular concern. In these cases, the maximum allowable concentrations (MAK values) have to be complied with, and general emissions to the environment have to be prevented and the relevant conditions met.

As part of the overall manufacturing process, depth filtration has to produce safe, reproducible, economic results to conform with uniform quality requirements.

Our quality policy aims to produce and supply products and services of consistent, outstanding quality.

Eaton achieves this through on-going performance testing and continuous development with technology. Staff at all levels contribute to ensuring and continuously improving the quality of products and services.

The procedures for the verification and documentation of our product quality are based on more than eighty years of experience in the production of depth filter media and are compatible with internationally recognized standard methods. Our devices and system solutions comply with national and international standards, directives and laws such as cGMP, FDA, EC, VDI, as well as internal client-specific regulations.

The scope of the qualification and verification policy and of the documentation is specified by the client within the design qualification (DQ) phase in form of a requirements specification.

The verification of the delivery occurs once:

- Acceptance from the manufacturer is received
- Verification of the technical documentation such as material certificates, conformity with FDA/cGMP relevant documents/forms, are defined and recorded in the installation qualification (IQ)

The operation qualification (OQ) is comprised of:

- Functional test
- Commissioning
- Training
- Data logging/protocols
- Data evaluation
- Final report

Innovative concepts for product development and quality assurance ensure maximum safety for your filtration tasks.

Technical Data

	BECO INTEGRA PLATE 400 EC	BECO INTEGRA PLATE 600 EC
Connections (round threaded connecting piece DIN 11851, flange DIN 2633, Tri-Clamp ISO 2852):		
• Inlet	DN 25/1"	DN 65/1"
• Outlet	DN 25/1"	DN 65/1"
• External chamber	DN 10/0.4"	DN 15/0.6"
Operating pressure	Max. 87 psi (600 kPa/6 bar)	Max. 87 psi (600 kPa/6 bar)
Differential pressure	Max. 58 psi (400 kPa/4 bar)	Max. 58 psi (400 kPa/4 bar)
Operating temperature	Max. 284 °F (140 °C)	Max. 284 °F (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. 129.2 ft ² (12 m ²)	Max. 538.2 ft ² (50 m ²)
• Cake filtration	Max. 59.4 ft ² (1.6 in cake frame) [Max. 5.52 m ² (40 mm cake frame)]	Max. 229.6 ft ² (1.6 in cake frame) [Max. 21.33 m ² (40 mm cake frame)]
Effective filter area/filter element	1.3 ft ² (0.12 m ²)	3.6 ft ² (0.33 m ²)
Cake volume (usable)	Max. 26.1 gal (98.9 l)	Max. 98.5 gal (373 l)

	BECO INTEGRA PLATE 400 DC	BECO INTEGRA PLATE 600 DC
Connections (round threaded connecting piece DIN 11852, flange DIN 2633, Tri-Clamp ISO 2852):		
• Inlet	DN 25/1"	DN 65/1 1/2"
• Outlet	DN 25/1"	DN 65/1 1/2"
Operating pressure	Max. 87 psi (600 kPa/6 bar)	Max. 87 psi (600 kPa/6 bar)
Differential pressure	Max. 58 psi (400 kPa/4 bar)	Max. 58 psi (400 kPa/4 bar)
Operating temperature	Max. 284 °F (140 °C)	Max. 284 °F (140 °C)
Materials:		
• Parts in contact with the product	AISI 316L	AISI 316L
• Other parts	AISI 3041	AISI 304
• Gaskets	Silicone, EPDM, viton, FEP coated	Silicone, EPDM, viton, FEP coated
Filter area:		
• Sheet filtration	Max. 129.2 ft ² (12 m ²)	Max. 516.7 ft ² (48 m ²)
• Cake filtration	Max. 59.4 ft ² (1.6 in cake frame) [Max. 5.52 m ² (40 mm cake frame)]	Max. 229.6 ft ² (1.6 in cake frame) [Max. 21.33 m ² (40 mm cake frame)]
Effective filter area/filter element	1.3 ft ² (0.12 m ²)	3.6 ft ² (0.33 m ²)
Cake volume (usable)	Max. 25.6 gal (97 l)	Max. 93.0 gal (352 l)

	BECO INTEGRA PLATE 200 EP/OEP	BECO INTEGRA PLATE 400 EP/OEP	BECO INTEGRA PLATE 600 EP/OEP	BECO INTEGRA PLATE 800 EP/OEP	BECO INTEGRA PLATE 1000 EP/OEP
Connections (Tri-Clamp ISO 2852/ASM BSP):					
• Inlet	3/4"	1"	1 1/2"	2"	2"
• Outlet	3/4"	1"	1 1/2"	2"	2"
• External chamber	1/2"	1"	1 1/2"	2"	2"
Operating pressure	Max. 72.5 psi (500 kPa/5 bar) at max. 104 °F (40 °C)	Max. 72.5 psi (500 kPa/5 bar) at max. 104 °F (40 °C)	Max. 72.5 psi (500 kPa/5 bar) at max. 104 °F (40 °C)	Max. 72.5 psi (500 kPa/5 bar) at max. 104 °F (40 °C)	Max. 72.5 psi (500 kPa/5 bar) at max. 104 °F (40 °C)
Differential pressure	Max. 43.5 psi (300 kPa/3 bar) at max. 104 °F (40 °C)	Max. 43.5 psi (300 kPa/3 bar) at max. 104 °F (40 °C)	Max. 43.5 psi (300 kPa/3 bar) at max. 104 °F (40 °C)		
Operating temperature	Max. 185 °F (85 °C) at max. 14.5 psi (100 kPa/1 bar)	Max. 185 °F (85 °C) at max. 14.5 psi (100 kPa/1 bar)	Max. 185 °F (85 °C) at max. 14.5 psi (100 kPa/1 bar)	Max. 185 °F (85 °C) at max. 14.5 psi (100 kPa/1 bar)	Max. 185 °F (85 °C) at max. 14.5 psi (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. 784 ft ² (728 m ²)	Max. 81.8 ft ² (760 m ²)	Max. 312.2 ft ² (36.18 m ²)	Max. 634.6 ft ² (58.96 m ²)	Max. 1226.7 ft ² (113.96 m ²)
• Cake filtration	Max. 723 ft ² (1.2 in cake frame) [Max. 0.672 m ² (30 mm cake frame)]	Max. 75.4 ft ² (1.2 in cake frame) [Max. 700 m ² (30 mm cake frame)]	Max. 175 ft ² (1.2 in cake frame) [Max. 33.48 m ² (30 mm cake frame)]	Max. 606.2 ft ² (1.2 in cake frame) [Max. 56.32 m ² (30 mm cake frame)]	Max. 1035.5 ft ² (1.2 in cake frame) [Max. 96.20 m ² (30 mm cake frame)]
Effective filter area/filter element	0.3 ft ² (0.028 m ²)	1.1 ft ² (0.10 m ²)	3.12 ft ² (0.27 m ²)	4.7 ft ² (0.44 m ²)	7.97 ft ² (0.74 m ²)
Cake volume (usable)	Max. 3.25 gal (2.4 in cake frame) [Max. 12.3 l (60 mm cake frame)]	Max. 33.3 gal (2.4 in cake frame) [Max. 126 l (60 mm cake frame)]	Max. 1178 gal (2.4 in cake frame) [Max. 626 l (60 mm cake frame)]	Max. 281.3 gal (2.4 in cake frame) [Max. 1065 l (60 mm cake frame)]	Max. 462.3 gal (2.4 in cake frame) [Max. 1750 l (60 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 25/1"	DN 65/1 1/2"
• Outlet	DN 25/1"	DN 65/1 1/2"
Operating pressure	Max. 72.5 psi (500 kPa/5 bar) at max. 68 °F (20 °C)	Max. 72.5 psi (500 kPa/5 bar) at max. 68 °F (20 °C)
Differential pressure	Max. 43.5 psi (300 kPa/3 bar) at max. 68 °F (20 °C)	Max. 43.5 psi (300 kPa/3 bar) at max. 68 °F (20 °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. 71 ft ² (6.60 m ²)	Max. 312.2 ft ² (29.00 m ²)
• Cake filtration	Max. 59.2 ft ² (1.2 in cake frame) [Max. 5.50 m ² (30 mm cake frame)]	Max. 244.1 ft ² (1.2 in cake frame) [Max. 22.68 m ² (30 mm cake frame)]
Effective filter area/filter element	1.18 ft ² (0.11 m ²)	3.12 ft ² (0.29 m ²)
Cake volume (usable)	Max. 27 gal (2.4 in cake frame) [Max. 102 l (60 mm cake frame)]	Max. 118 gal (2.4 in cake frame) [Max. 446 l (60 mm cake frame)]



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