BECODISC® STACKED DISC CARTRIDGES

Leaflet F-16-01-UK

FLUXA Fluxa Filtri S.p.A.
V.le A. De Gasperi, 88/B-20017 Mazzo di Rho (MI)
Tel. 0293959.1 (15 lines)
Fax 0293959.400-440-470
e-mail: info@fluxafiltri.com - www.fluxafiltri.com

Your Benefit

BECODISC® stacked disc cartridges
The individual cells of the **BECODISC®** stacked disc cartridges are made up using BECO depth filter sheets.

The innovative technology of this depth filter medium offers the following benefits:

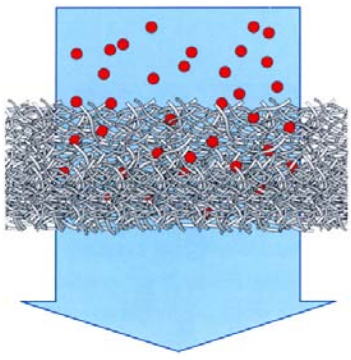
Optimum adaptation to a wide variety of filtration tasks
- Wide range of types
- Sealing and plastic materials
- Different filter areas

Protection against bypass effects
- Precise sealing of the filter cells through polypropylene edge molding
- Constant final pressing
- Stable unit, even during sterilization, through optimized three-part stainless steel segment sleeve
- Double O-ring adapter available

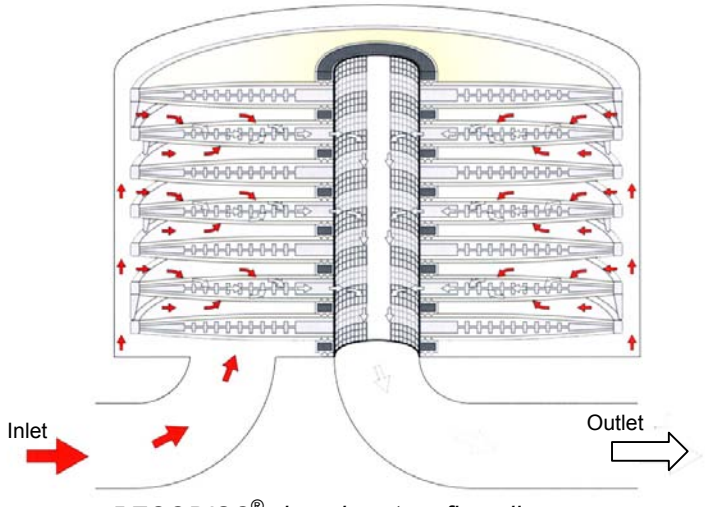
Performance
- Optimum flow path within the cell through internal drainage plate
- Constant cell distance ensures full utilization of the whole filter surface
- Special stacked disc cartridge version (see p. 11)

BEGEROW's basic aim is to provide high-quality customer products through optimum depth filter medium, thus contributing to the cost effectiveness of the process.

Pre-trials are carried out to determine the optimum depth filter type for each task. Our filtration specialists are available to assist our customers with this task. Particularly complex problems can be solved in cooperation with our application engineers on site and with the BEGEROW filtration service center.

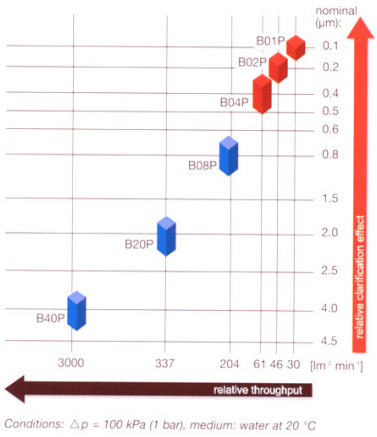


The principle of depth filtration



BECODISC® closed system flow diagram

The main BECODISC® Stacked Disc Cartridges Types

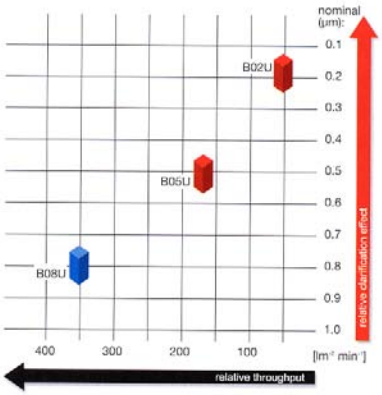


Conditions: △p = 100 kPa (1 bar), medium: water at 20 °C

Low-endotoxin and low-ion filters BECODISC® BP range

The BP range of BECODISC® stacked disc cartridges meets the exacting requirements of the pharmaceutical industry (e.g. for the filtration of fermenter broth). Particularly pure raw materials and a special production method ensure an endotoxin content of < 0,25 EU/ml. Our longstanding experience in the production of stacked disc cartridges, combined with the specialist production technology guarantees an efficient and lowendotoxin depth filter medium. A validation guide is available providing support for the design, execution and documentation of a validation.

Further details can be found in the Technical Information 1 A 2.5.5.9 Main applications: pharmaceutical, biotechnology.



Conditions: △p = 100 kPa (1 bar), medium: water at 20 °C

BECODISC® BU range

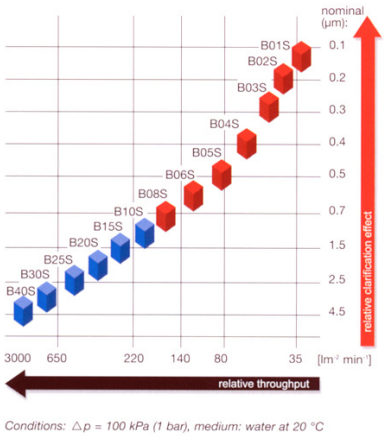
The BU range of stacked disc cartridges was developed in order to ensure optimum filtration results. The use of high-purity raw materials ensures minimum content of extractable components (e.g. aluminium) and minimum endotoxin content (< 0.125 EU/ml). The stacked disc cartridges meet the requirements of USP XXIII in terms of oxidizable substances. A validation guide is available providing support for the design, execution and documentation of a validation. The use of the BU range ensures compliance with the high quality requirements for pharmaceutical products.

Further details can be found in the Technical Information 1 A 2.5.5.6 Main applications: pharmaceutical, biotechnology.

Filters containing activated carbon BECODISC® B30C

The BECODISC® B30C stacked disc cartridge has a high adsorption capacity, achieved through a high content of particularly highly active activated carbon. These adsorptive characteristics enable, for example, the decolorization of protein solutions. The BECODISC® B30C is also very suitable for lipid removal or dechlorination.

Further details can be found in the Technical Information 1 A 2.5.5.11Main applications: pharmaceutical, biotechnology, chemistry, cosmetics

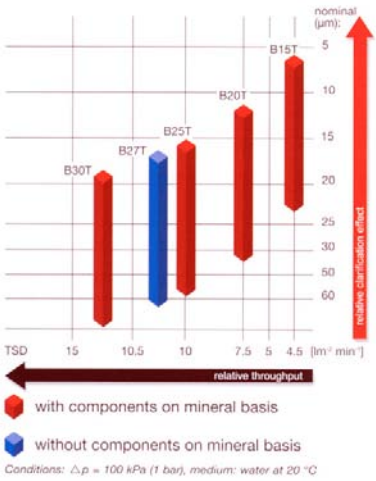


Conditions: Δp = 100 kPa (1 bar), medium: water at 20 °C

Standard filters BECODISC® BS range

Standard BECODISC® stacked disc cartridges are used in the chemical, cosmetics and food industry. This stacked disc cartridge range is also used successfully in certain sections of the pharmaceutical and biotechnology industry (e.g. process water). Numerous grades covering a wide retention range enable precise adaptation to the respective task within the required separation range.

Further details can be found in the Technical Information 1 A 2.5.5.8 Main applications: chemistry, cosmetics, pharmaceutical, biotechnology.

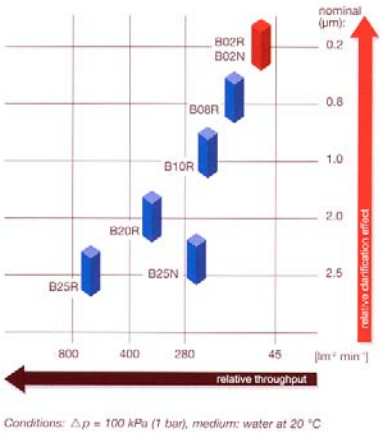


Conditions: Δp = 100 kPa (1 bar), medium: water at 20 °C

BECODISC® BT range

The BT range of BECODISC® stacked disc cartridges is optimized for the filtration of highly viscous liquids with particles of coarse, crystalline, amorphous or gel-like structure. The BT range of stacked disc cartridges is therefore mainly used in the chemical, cosmetics and food industry.

Further details can be found in the Technical Information 1 A 2.5.5.12 Main applications: chemistry, cosmetics, pharmaceutical, biotechnology.



Conditions: Δp = 100 kPa (1 bar), medium: water at 20 °C

Stacked disc cartridges with increases chemical resistance

BECODISC® BR/BN range. The BR/BN range of BECODISC® stacked disc cartridges is characterized by increased chemical and mechanically resistance, which is particularly significant for the filtration of aggressive media (e.g. acids and alkaline solutions). This is achieved through the use of up to 40% of polyolefin fibers. The B25N und B02N versions were developed specifically for the filtration of enzyme solutions.

They are characterized by high longterm stability when used for the filtration of cellulose-containing enzyme solutions.

Further details can be found in the Technical Information 1 A 2.5.5.10 Main applications: pharmaceutical, biotechnology, chemistry.

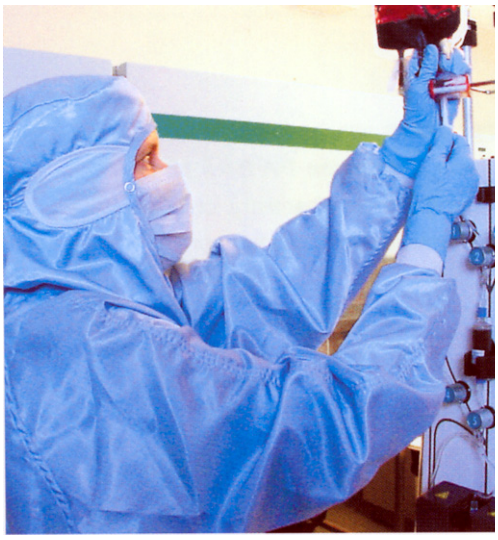
Stacked disc cartridges with support sheets for precoat filtration for the chemical and pharmaceutical industries: availability on request.

Areas of Application

➢ Biotechnology and pharmaceutical industry

For **biotechnology** applications, filtration via BECODISC® stacked disc cartridges takes place, for example, after the separation of the biomass and prior to the concentration of the resource substance and ingredients through vaporization of freeze drying.

BECODISC® stacked disc cartridges reliably separate cells, cell fragments, micro-organisms and endotoxins from fermenter broth.



➢ In the **pharmaceutical industry,** depth filtration is mainly used to achieve large reductions of haze, i.e. the removal of particles < 5 µm, of micro-organisms and of pyrogens in raw materials, intermediate products and end products (germ-reducing filtration). High retention rates and short dwell times of the products within the stacked disc cartridges are particularly beneficial. Further areas of application are cell harvest and the production of human or veterinary plasma, culture media, antibiotics and vaccines.

BECODISC® stacked disc cartridges can also be used for the protection of final membrane filters and chromatography columns.

Chemical and cosmetics industry

In the **chemical industry.** filtration is used for the removal of residues from raw, intermediate or end products, or from auxiliary materials. Varnishes, paints, synthetic resins, process water and waste water, pesticides and abrasives, wax and industrial oils offer a wide range of opportunities for the effective application of the different BECODISC® stacked disc cartridges ranges.

The purity criteria in the **cosmetics industry** and restrictions in the use of preservatives require the avoidance of germs during production as far as possible. This is ensured through the use of BECODISC® stacked disc cartridges (germ-reducing filtration) during the processing of essential oils, resins and terpenes, creams, shampoos and lotions, face and hair lotions, skin and bath oils.

Suitable Solutions for a Large Number of Applications

Companies from a wide range of industries rely on depth filter media from BEGEROW

Application example	BECODISC® Type from	Stacked disc cartridges - to
Biotechnology		
Vitamin suspensions	B01S	- B02S
Enzyme solutions	B02U	- B08U
	B02N	- B25N
Fermenter broth	B08P	- B40P
Pharmaceutical industry		
Proteine solutions	B01S	- B02S
Organic extracts	B01S	- B06S
Ointment base	B20S	- B40S
	B15T	- B27T
Process water	B01S	- B30T
Ethylene glycol	B15S	- B25S
Amino acids	B10S	- B15S
	B02U	- B08U
Plant extracts	B08S	- B20S
Camomile press juice	B15S	- B25S
	B02N	- B25N
Dialysis concentrates	B02U	- B08U
Human serum albumin	B05U	- B08U
I-globulins	B05U	- B08U
Plasma expander solution	B02U	- B05U
Coagulation factors	B05U	- B08U
Hormones	B02U	- B08U
Infusion solutions	B02U	- B08U
Rabbit or horse serums	B02U	- B08U
Cell culture media	B01P	- B40P
Alcoholic herb extracts	B08S	- B40S
Syrup	B15T	- B30T
Vaccines	B01S	- B02S
	b02U	- B08U

Application example	BECODISC® Type from	Stacked disc cartridges - to
Chemical industry		
Alkyd resins	B30S	- B27T
Resin melts	B25T	- B27S
Industrials oils	B15S	- B20S
Oil varnishes	B15S	- B25S
Photographic emulsions	B06S	- B20S
Insulation oils	B20T	- B27T
Boiled linseed oils	B20T	- B27T
Clear varnishes	B20S	- B27T
Photo resist	B05U	- B08U
Silicone oils	B40S	- B10S
Activate carbon removal	B08S	- B40S
	B08P	- B40P
Active ingredients	B08S	- B40S
	B08P	- B40P
Organic solvents	B08S	- B40S
	B02R	- B25R
Cosmetics industry		
Nail varnish	B20T	- B27T
Cosmetic oils	B10S	- B15S
Vaseline	B15S	- B25S
Hair lotions	B04S	- B15S
Aftershave	B15S	- B20S
Eau de Cologne	B06S	- B10S
Face lotions	B04S	- B15S
Tensides	B10S	- B27T
Active earth separation	B15T	- B27T

Enclosed Filtration System BECO INTEGRA® DISC

Depth filter media of BEGEROW are used in the following different filtration systems: in enclosed plate and frame filters, stacked disc cartridge housings and laboratory filters, and in a range of classic plate and frame filters. These BERERROW filtration systems are developed by BEGEROW process technology.

Enclosed filtration systems

As en enclosed system, the product line BECO INTEGRA® is the alternative to classic filtration systems, wherever the protection of operating personnel and product is a priority.

BECO INTEGRA® DISC

Concept and configuration

BECO INTEGRA® DISC are enclosed filter housings consisting of a bottom part with 3 legs and a detachable housing dome. The bottom part with inlet and outlet socket contains the centering and mounting unit for holding the stacked disc cartridge with a flat adapter or double O-ring adapter. The connection between the flat bottom part and the housing dome is realized through a quick closure devise in V-ring design or through clamp screws.

Modules and types

The complete system consisting of BECODISC® stacked disc cartridges and BECO INTEGRA® DISC housings should be individually configured for every application. Stacked disc cartridge housings are available in a variety of size, design and types.

BECO INTEGRA® DISC 12”

Stacked disc cartridge housing for holding 1-4 stacked disc cartridges with filter areas from 0.59 m^2 up to a maximum of 8 m^2.

Types:

- **Industrial version**
  Classic stacked disc cartridge housing for a variety of applications
- **Chemicals version**
  Stacked disc cartridge housing with elevated edge at the bottom part and clamp screw closure for
  - clean production conditions
  - difficult to handle products
  - safe handling of aggressive media
- **Pharmaceutical version**
  Stacked disc cartridge housing in sanitary design with
  - TC connections according to ISO
  - CIP/SIP capability
  - diaphragm valves and manometer
  - FDA-compliant gaskets

BECO INTEGRA® DISC 16”

Stacked disc cartridge housing for holding 1-4 stacked disc cartridges with filter areas from 1.15 m^2 up to a maximum of 15.6 m^2 .

Types:

- Industrial version
- Chemical version
- Sanitary design

BECO INTEGRA® DISC 16”/…

Multi-column stacked disc cartridge housing for holding up to 6 columns, each with 4 stacked disc cartridges with filter areas from 11.1 m^2 up to a maximum 93.6 m^2. The stacked disc cartridge housing type is determined by the respective application. BEGEROW process technology offers a wide range of components and devices, including complex filtration systems.

Using these resources, the engineering specialists fro BEGEROW process technology develop optimized solutions for each customer. They offer competent and practical support from the preparation of the requirements profile and its implementation in practice, from delivery documentation to customer staff training.

Quality at BEGEROW: more than just a Word

At BEGEROW, consistently high product quality is a must for the products of our customers - i.e. you - in order to be able to meet precisely defined quality requirements.
As part of the manufacturing process, the depth filter media is partly responsible for safe, reproducible and therefore economic results at our customers.

We meet this responsibility by ensuring that our products comply with national and international quality standards such as the German LMBG [(1)], the FDA [(2)] guidelines, the hygienic guidelines according to HAACP [(3)] etc.
As early as 1993, BEGEROW was certified according to DIN EN ISO 9001 and has been complying with DIN EN ISO 9001:2000 since 2002.
Moreover, we make ourselves available for regular audits through external, independent institutes and customers.

BECO depth filter sheets are listed with the FDA under the following master file numbers:

- Drug Master File DMF 9926
- Biological Master File BB-MF 4797
- Device Master File MAF 427

BECODISC€ stacked disc cartridges are listed with the FDA under the following master file number:

- Drug Master File DMF 15690

Furthermore, BECO depth filter sheets meet the following requirements:

- FDA guideline CFR, Part 177.2260 g, h, j, l Vol. 21, Chapter 1
- Recommendation XXXVI of the BfR [(4)] for the hygienic assessment of plastics and other polymers according to the food stuff legislation BfR
- Recommendation XXXVI/1 for boiling and hot filter papers and depth filter sheets

The procedures for the verification and documentation of our product quality are based on more than sixty years of experience in the production of depth filter media and comply with internationally recognized standard methods. Staff at all levels of our company contribute to ensuring and continuously improving the quality of our products and services.

(1) German “Lebensmittelgegenständebedarfsgesetz”
(2) Food and Drug Administration, USA
(3) Hazard Analysis of Critical Control Points
(4) Federal Institute of Risk Appreciation

Quality Management ISO 9001:2000
Reg. No. 000480 QM

Technical Data

BECODISC® BP range

Type	Utilized depth filter sheet	Nominal retention rate [µm]	Thickness [mm]	Ash content [%]	Mass per unit area [g m $^{-2}$]	Bursting strength dry [kPa]	Bursting strength wet [kPa]	Water permeability at Δp = 100 kPa [l m $^{-2}$ min $^{-1}$]
B01P	PR Steril S 100	0.1	3.9	60.0	1375	> 200	> 50	30
B02P	PR Steril S 80	0.2	3.9	49.0	1375	> 280	> 80	46
B04P	PR Steril 40	0.4	3.9	49.0	1344	> 200	> 50	61
B08P	PR 12	0.8	3.9	50.0	1220	> 400	> 150	204
B20P	PR 5	2.0	3.9	49.0	1220	> 300	> 150	337
B40P	PR 1	4.0	3.9	48.0	1150	> 200	> 100	3000

BECODISC® BU range

Type	Utilized depth filter sheet	Nominal retention rate [µm]	Thickness [mm]	Ash content [%]	Mass per unit area [g m $^{-2}$]	Bursting strength dry [kPa]	Bursting strength wet [kPa]	Water permeability at Δp = 100 kPa [l m $^{-2}$ min $^{-1}$]
B02U	PR Steril S 80UP	0.2	3.9	49.0	1281	> 330	> 100	64
B05U	PR 12 UP	0.5	3.9	49.0	1156	> 230	> 80	167
B08U	PR 5 UP	0.8	4.1	49.0	1125	> 220	> 60	354

BECODISC® B30C

Type	Utilized depth filter sheet	Nominal retention rate [µm]	Thickness [mm]	Ash content [%]	Mass per unit area [g m $^{-2}$]	Bursting strength dry [kPa]	Bursting strength wet [kPa]	Water permeability at Δp = 100 kPa [l m $^{-2}$ min $^{-1}$]
B30C	ACF 07	3.0	3.5	15.0	1000	> 100	> 40	1529

BECODISC® BS range

Type	Utilized depth filter sheet	Nominal retention rate [µm]	Thickness [mm]	Ash content [%]	Mass per unit area [g m $^{-2}$]	Bursting strength dry [kPa]	Bursting strength wet [kPa]	Water permeability at Δp = 100 kPa [l m $^{-2}$ min $^{-1}$]
B01S	Steril S 100	0.1	3.9	57.5	1375	> 200	> 50	30
B02S	Steril S 80	0.2	3.9	50.0	1375	> 280	> 80	40
B03S	Steril 60	0.3	3.8	50.0	1375	> 230	> 50	52
B04S	Steril 40	0.4	3.8	49.0	1344	> 230	> 50	65
B05S	SD 30	0.5	3.8	50.0	1344	> 230	> 50	80
B06S	KDS 15	0.6	3.8	50.0	1344	> 250	> 50	124
B08S	KDS 12	0.8	3.8	50.0	1344	> 250	> 50	155
B10S	KD 10	1.0	3.8	50.0	1313	> 250	> 50	185
B15S	KD 7	1.5	3.8	50.0	1281	> 250	> 50	240
B20S	KD 5	2.0	3.8	50.0	1250	> 230	> 50	290
B25S	KD 3	2.5	3.8	50.0	1188	> 200	> 40	470
B30S	K 2	3.0	3.8	46.0	1094	> 200	> 50	1625
B40S	K 1	4.0	3.8	42.0	1050	> 230	> 60	2000

BECODISC® BT range

Type	Utilized depth filter sheet	Nominal retention rate [µm]	Thickness [mm]	Ash content [%]	Mass per unit area [g m $^{-2}$]	Bursting strength dry [kPa]	Bursting strength wet [kPa]	Water permeability at Δp = 100 kPa [l m $^{-2}$ min $^{-1}$]
B15T	CP07S	15.0	3.6	35.0	940	> 200	> 110	4290
B20T	CP03S	20.0	3.7	35.0	890	> 150	> 90	7140
B25T	CP02S	25.0	3.3	17.0	700	> 180	> 90	9520
B30T	CP01S	30.0	4.6	17.0	850	> 180	> 100	12500
B27T	CP2KS	27.0	2.9	< 1.0	625	> 300	> 150	9760

BECODISC® BR / BN range

Type	Utilized depth filter sheet	Nominal retention rate [µm]	Thickness [mm]	Ash content [%]	Mass per unit area [g m $^{-2}$]	Bursting strength dry [kPa]	Bursting strength wet [kPa]	Water permeability at Δp = 100 kPa [l m $^{-2}$ min $^{-1}$]
B02R	CR 800	0.2	3.8	48.0	1344	> 230	> 90	50
B08R	CR 600	0.8	3.8	48.5	1313	> 250	> 90	160
B10R	CR 500	1.0	3.8	46.5	1250	> 200	> 90	230
B20R	CR 400	2.0	3.8	48.5	1250	> 200	> 90	320
B25R	CR 200	2.5	3.8	22.0	913	> 380	> 200	750
B02N	CR 800 N	0.2	3.8	47.0	1313	> 360	> 230	40
B25N	CR 300 N	2.5	3.8	47.0	1125	> 290	> 220	230

Configuration

BECODISC® 12” (Ø 295 mm)

Number of cells		17		16		14	9 (1)		9		5 (2)
Overall height [mm]		276		276		276	276		195		154
Filter surface area [m^2]		2.0		1.9		1.65	1.1		1.1		0.59
Protective fleece (polyester) (3)		without		without		without	with		without		without
Stacked disc cartridge weight (dry) [Kg]	**Stacked disc cartridge weight (wet) [Kg]** (4)	4.4	13.3	4.2	12.5	3.5	10.3	2.2	6.5	2.0	6.3	1.1	3.5
Precoat volume [l] (5)						3.6	8.0				

BECODISC® 16” (Ø 402 mm)

Number of cells		17		16		14	9 (1)		9		5 (2)
Overall height [mm]		276		276		276	276		195		154
Filter surface area [m^2]		3.9		3.7		3.2	2.1		2.1		1.15
Protective fleece (polyester) (3)		without		without		without	with		without		without
Stacked disc cartridge weight (dry) [Kg]	**Stacked disc cartridge weight (wet) [Kg]** (4)	9.6	24.0	9.1	22.8	7.9	19.9	5.5	12.7	5.3	12.5	3.1	6.9
Precoat volume [l] (5)						7.0	15.4				

(1) Special stacked disc cartridge version with cell spacer rails providing increased mechanical stability for holding filter cakes
(2) 5-cell stacked disc cartridges exclusively with double O-ring adapter
(3) BECODISC® B30C: design with protective fleece
(4) Measured with water at 20 °C
(5) Calculated values (BECO depth filter sheet with 4 mm thickness)

STRUCTURE OF ARTICLE NUMBERS

B	02	S	1	2	S	F

Stocked disc cartridge types:

B = injection molded parts, polypropylene,
three-part stainless steel segmented sleeve
C = injection molded parts, polyamide,
three-part stainless steel segmented sleeve

Nominal retention rate:

here 0.2 µm

Product range and version:

S = Standard range
P = pharmaceutical range (PR range)
U = UltraPure® (PR UP range)
R = CR range
N = CR types with high enzyme stability (CR-N)
T = CP..S range
C = activated carbon stacked disc cartridge

Number of filter cells:

1 = 17 filter cells (276 mm overall height)
6 = 16 filter cells (276 mm overall height)
4 = 14 filter cells (276 mm overall height)
3 = 9 filter cells (276 mm overall height)
9 = 9 filter cells (195 mm overall height)
5 = 5 filter cells (154 mm overall height
only with double O-ring adapter)

Size:

2 = 12”, 295 mm Ø
(only stacked disc cartridges with 9 cells
276 mm overall height are equipped with
polyester protective fleece as standard
4 = 16”, 402 mm Ø

Sealant:

S = silicone
E = EPDM
V = fluoroelastomer/Viton

Adapter:

F = Flat adapter
S = Double O-ring adapter