

BECO CARBON filter media with activated carbon



Powering Business Worldwide

Eaton supports quality and innovation with filter media containing activated carbon

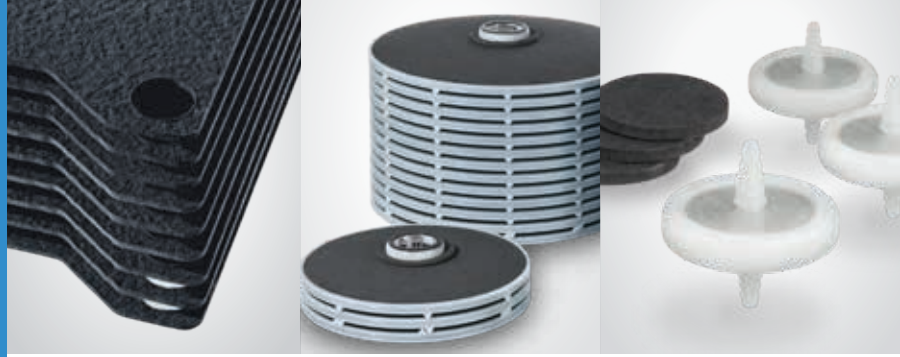
In pharmaceutical, biotechnological, fine chemical processing, and in the food & beverage industries the activated carbon is used for decolorization as well as for the removal of undesired by-products, taste, odor and color correction. It is often introduced manually into the process as a powder also referred to as PAC (Powdered Activated Carbon).

This is a time consuming and demanding process that requires a containment room to prevent released dusts from reaching other production areas and special protection of the operators.

This effort is eliminated with the BECO CARBON™ depth filter sheet because the activated carbon is already bound in the depth filter sheet.

The main advantages of immobilized activated carbon compared to loose PAC is the minimized dust exposure and the optimized downstream process. Furthermore, the scale-up is simplified due to the predictable filtration capacity.

In addition to the BECO CARBON depth filter sheets, the range includes BECODISC® BC stacked disc cartridges and small disposable capsules. The product program thus covers the requirements from laboratory to full production scale.



Selection guide for BECO CARBON activated carbon depth filter sheets

Eaton offers the new filter media containing activated carbon for adsorption and decolorization in different porosities. BECO CARBON depth filter sheets are available in the versions ACF 07.10 (meso/macro-porous) with 420 g/m² activated carbon content, ACF 02 (macroporous) and ACF 03 (mesoporous) with an activated carbon content of 1000 g/m².

Since the activated carbon content is precisely defined in the filter material, a high, reproducible product quality and filtration performance in the applications is also guaranteed.

The activated carbon of the BECO CARBON depth filter sheets is a microporous, inert material with a very large inner surface of up to

2000 m²/g of activated carbon. The activated carbon used can be further differentiated into different porosity ranges:

Macroporous (Ø >50 nm)

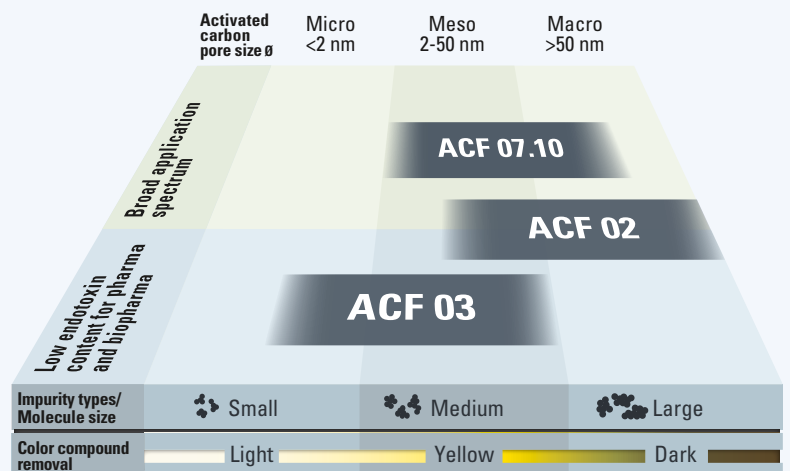
Decolorization of dark discolorations (brown to yellow) and for the separation of large molecules (e.g., protein separation).

Mesoporous (Ø 2-50 nm)

Decolorization of medium discoloration (yellow to yellowish) and impurities, as well as for correcting the taste of food.

Microporous (Ø <2 nm)

Decolorization of light discolorations (yellowish to whitish-gray), for odor correction and for the separation of smaller molecules (e.g., endotoxins).





Main applications

The upgraded BECO CARBON depth filter sheets provide particularly high adsorption properties for the demanding filtration of liquids. With their strong decolorization abilities and adsorptive removal of undesired by-products, along with taste, odor and color correction, they are ideally suited for use in the fine chemical, pharmaceutical, cosmetic, food and beverage and biotechnology industries.

Whether blood plasma or antibiotics, food supplements and trendy drinks or process water treatment, activated carbon as a filter material has become indispensable in many applications.

All depth filter sheets of the BECO CARBON range meet the requirements of Regulation (EG) 1935/2004 and the German LFGB (Food, Commodity and Feed Act) as

well as the test criteria of the FDA (U.S. Food and Drug Administration) guidelines according to 21 CFR § 177.2260.

For pharmaceutical applications, the BECO CARBON ACF 02 and ACF 03 depth filter sheets are checked for endotoxin content—for maximum safety and product quality.

BECO CARBON ACF 03 activated carbon depth filter sheets meet the requirements of USP Class VI tests and a Validation Guide is available on request.

The following application selections demonstrate the diversity of tasks for which activated carbon offers safe and efficient purification.

| | Applications | Filtration tasks |
|-------------------------------------|--|--|
| Pharma, biotech, diagnostics | <ul style="list-style-type: none"> • Active ingredient solutions • Antibiotic solutions • Blood plasma products • Contrast media | <ul style="list-style-type: none"> • Decolorization and removal of organic impurities • Protein and endotoxin removal • Purification of blood plasma products and treatment of contrast media |
| Cosmetics | <ul style="list-style-type: none"> • Plant extracts and cosmetic ingredient | <ul style="list-style-type: none"> • Decolorization |
| Food and beverages | <ul style="list-style-type: none"> • Glucose, enzyme and vitamin solutions • Food or dietary supplements • Spirits, fruit juices and hard seltzer | <ul style="list-style-type: none"> • Removal of unwanted by-products • Decolorization • Correction of taste and color |
| Chemicals | <ul style="list-style-type: none"> • Chemicals, organic solvents and synthetic oils • Silicone oils | <ul style="list-style-type: none"> • Decolorization and removal of organic impurities • Removal of "off-flavor" and unwanted by-products |

From laboratory to full production scale

Eaton offers an ideal concept for facilitating laboratory trials, preproduction trials and transferring the results with the same activated carbon depth filter medium to the full production scale. The range of filter areas available, enables ideal adaptation to the respective batch size and therefore cost optimization of the process.



Lab scale

BECO INTEGRA® LAB
enclosed laboratory filtration systems
60 P, 140 P, 220 P
3.25 in²–0.66 ft²
(20.8 cm²–628 cm²)

BECO MiniCap ACF
disposable filter unit
3.3 in² (21.2 cm²)

Pilot scale

BECO INTEGRA PLATE
enclosed plate and frame filters
0.60–9.04 ft²
(0.056–0.840 m²)

BECO INTEGRA DISC
stacked disc cartridge housings, 4.3 – 16.7 ft²
(0.4 – 1.55 m²)

Production scale

BECO INTEGRA PLATE
enclosed plate and frame filters
0.60–1210.93 ft²
(0.056–112.5 m²),
with cake frames of
0.78" (20 mm) in width

Designs

BECO CARBON activated carbon depth filter sheets

BECO CARBON depth filter sheets are available in various formats and are as varied as the filtration systems available in the market. Thanks to innovative precision waterjet cutting, Eaton can manufacture special formats for almost any filtration system.

| Type | Thick- ness | Ash content % | Bursting strength wet psi (kPa*) | Water throughput at $\Delta p = 14.5 \text{ psi}$ ($\Delta p = 100 \text{ kPa}^*$) | | Endotoxin content** EU/ml | Activated carbon content g/m ² |
|----------------------|----------------|---------------------|--|--|-----------------------|---------------------------------|--|
| | in (mm) | | | gpm/ft ² | l/m ² /min | | |
| ACF 07.10 | 0.15 (3.8) | 15 | > 11.6 (80) | 34.7 | (1415) | - | 420 |
| ACF 07.10S*** | 0.16 (4.0) | 15 | > 11.6 (80) | 29.8 | (1215) | - | 420 |
| ACF 02 | 0.21 (5.3) | 2.5 | > 11.6 (80) | 6.75 | (275) | < 0.125 | 1000 |
| ACF 03 | 0.20 (5.1) | 5 | > 11.6 (80) | 7.36 | (300) | < 0.125 | 1000 |

This information is intended as a guideline for the selection of BECO depth filter sheets. The water throughput is a laboratory value characterizing the different BECO CARBON activated carbon depth filter sheets. It is not the recommended flow rate.

* 100 kPa = 1 bar ** Endotoxin content analysis after rinsing with 1.23 gal/ft² (50 l/m²) of WFI (Water for Injection)

*** With protective paper on the outlet side for format 140 [15.7 x 15.7 in (400 x 400 mm)]



BECODISC BC activated carbon stacked disc cartridges

The individual cells of the BECODISC BC activated carbon stacked disc cartridges are constructed using BECO CARBON activated carbon depth filter sheets. In addition to handling simplicity, reduced setup times, increased personnel and product protection, the enclosed BECODISC system offers protection against bypass effects. BECODISC activated carbon stacked disc cartridges are used in BECO INTEGRA DISC™ stacked disc cartridge housings.

| Features | Benefits |
|--|---|
| <ul style="list-style-type: none"> • Various sizes and filter areas • Various gasket and plastic materials | <ul style="list-style-type: none"> • Handling of versatile filtration tasks. Polyamide design for higher temperature and chemical compatibility. |
| <ul style="list-style-type: none"> • Robust unit through stainless steel segmented sleeve | <ul style="list-style-type: none"> • Simple handling and reduced setup times |
| <ul style="list-style-type: none"> • Enclosed filter system • Precise sealing of filter cells • Excellent stability due to high final compression | <ul style="list-style-type: none"> • Hygienic design • High protection against bypass effects |
| <ul style="list-style-type: none"> • Optimal flow control • Consistent cell distance | <ul style="list-style-type: none"> • High performance through full utilization of filter surface area |



Stacked disc cartridge configuration¹

| Filter type design | BECODISC BC 12", Ø 11.6 in (295 mm) | | | BECODISC BC 16", Ø 15.8 in (402 mm) | | | |
|--|-------------------------------------|------------|-------------|-------------------------------------|------------|------------|------|
| | in polypropylene | B71C | B02C | B03C | B71C | B02C | B03C |
| | in polyamide | C71C | C02C | C03C | C71C | C02C | C03C |
| Construction code/Number of cells | | 16 | 13 | | 16 | 13 | |
| Filter surface area [m²] | | 20.5 (1.9) | 16.7 (1.55) | | 39.8 (3.7) | 32.3 (3.0) | |
| Activated carbon content [kg] | | 1.8 (0.8) | 3.4 (1.55) | | 3.3 (1.5) | 6.6 (3.0) | |
| Overall height flat adapter [mm] | | 10.9 (276) | 10.9 (276) | | 10.9 (276) | 10.9 (276) | |

BECO MiniCap ACF disposable filter units

BECO MiniCap™ ACF disposable filter units with BECO CARBON activated carbon depth filter sheets are ready-to-use for the filtration of small volumes for laboratory applications, scale-up trials and sample preparation.

| | |
|--|--|
| Effective filter area | 3.3 in ² (21.2 cm ²) |
| Reference values for the flow capacity | 0.08-0.14 gal/h (85-145 gfd) [5-8 ml/min (150-250 l/m ² /h)] |
| Reference values for filtration volumes | 0.05-2.6 gal (0.2-10 l) |



Ordering information

Note for orders:

Our 8-digit order no. consists of two parts:

- the 5-digit article no. and
- the 3-digit format no.

Examples for the format no. code:

Format 7.9 x 7.9 in (200 x 200 mm) = format no. 120

Format 15.7 x 15.7 in (400 x 400 mm) = format no. 140

Format 23.6 x 24.2 in (600 x 615 mm) = format no. 160

Example for order no.:

ACF 07.10 in format 15.7 x 15.7 in (400 x 400 mm) = 140

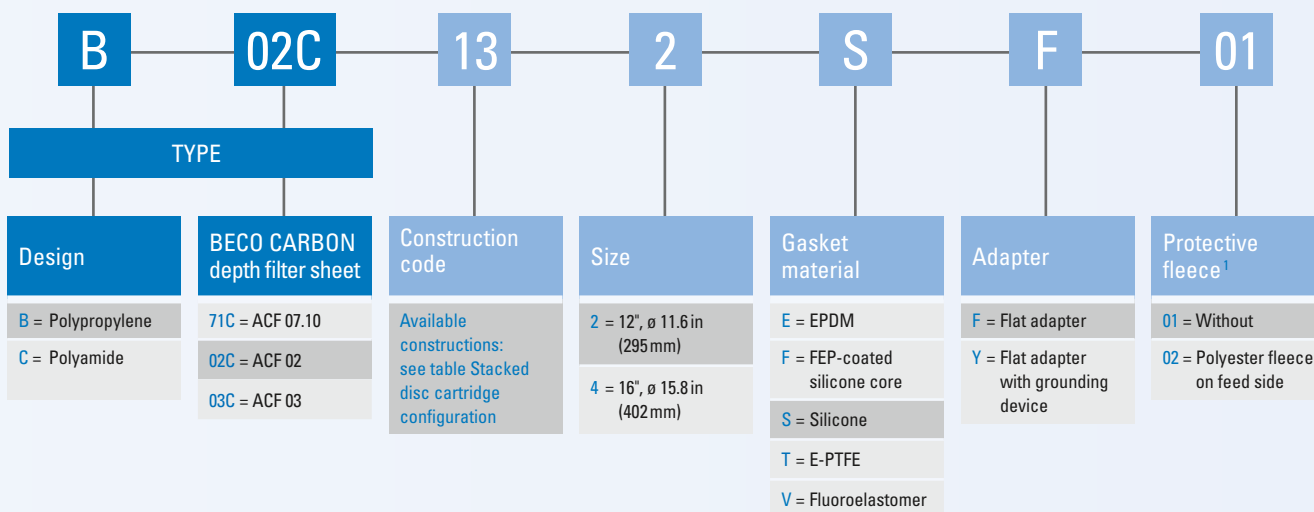
Type Article no.

| | |
|-----------|-------|
| ACF 07.10 | 19607 |
| ACF 02 | 19602 |
| ACF 03 | 19603 |



All common square or round filter sizes are available for delivery. Special formats are available upon request.

When changing the filter type or using a thicker filter sheet, it is important to check the suitability of the filter system in terms of sealing (special gaskets or filter elements may be required) and the size of the system (number of filter elements).



Example: B02C132SF01

Polypropylene stacked disc cartridge with BECO CARBON ACF 02 depth filter sheets, 13 filter cells, 10.9in (276mm) high, in 12" size with silicone gaskets, flat adapter and without protective fleece.

¹ Other stacked disc cartridge configurations on request:

- Different number of cells
 - 14 cells available in polypropylene (B71C, B03C) and in polyamide (C71C, C02C, C03C)
 - 9 cells available (B71C, C71C) with cell spacer rails providing increased mechanical stability for holding filter cake (10.9 in/276 mm) overall height with flat adapter)
 - 5 cells (B71C) and 3 cells (B02C, B03C) available for small volume filtration or pilot-scale-testing (4.0 in/101 mm overall height with flat adapter)
- Protective fleece optional for filter type B71C

| Order no. | Article description |
|-----------|-----------------------------|
| F071C300 | BECO MiniCap ACF 07.10 Kit* |
| F002C300 | BECO MiniCap ACF 02 Kit* |
| F003C300 | BECO MiniCap ACF 03 Kit* |

* One package contains three individually packed BECO MiniCap filter capsules. The carton label shows the article description, article and lot numbers.

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