Series TEFB 210-310
145 PSI

Dimensions:

<table>
<thead>
<tr>
<th>type</th>
<th>TEFB 210</th>
<th>TEFB 310</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>11.89</td>
<td>15.24</td>
</tr>
<tr>
<td>B</td>
<td>8.82</td>
<td>12.13</td>
</tr>
<tr>
<td>C</td>
<td>13.78</td>
<td>17.13</td>
</tr>
<tr>
<td>weight</td>
<td>5.0 lbs.</td>
<td>5.1 lbs.</td>
</tr>
<tr>
<td>volume tank</td>
<td>.26 Gal.</td>
<td>.36 Gal.</td>
</tr>
</tbody>
</table>

1) Connection for the potential equalization, only for application in the explosive area.

Dimensions: inches

Designs and performance values are subject to change!
Description:

Return-line filter series TEFB 210-310 have a working pressure up to 145 PSI. Pressure peaks will be absorbed by a sufficient margin of safety.

The TEFB-filters are directly mounted to the reservoir and connected to the return-line. No connection is needed for the built-in air filter. The air filter has a 10 µm disposable element.

The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside.

For cleaning the stainless steel mesh element or changing the filter element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

Filters finer than 40 µm use the disposable elements made of paper or microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements on request.

Eaton filter elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.

Eaton filter can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

When changing the filter element, a detachable connection between the filter head and the filter bowl prevents dirty oil from flowing into the tank.

1. Type index:

1.1. Complete filter: (ordering example)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEFB</td>
<td>210</td>
<td>10VG</td>
<td>16</td>
<td>S</td>
<td>P</td>
<td>UG</td>
<td>5</td>
<td>-</td>
<td>E1</td>
<td>O</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

- **series:** TEFB = tank-mounted return-line-filter with breather filter
- **nominal size:** 210, 310
- **filter material:**
  - 80G, 40G, 25G stainless steel wire mesh
  - 25VG, 16VG, 10VG, 6VG, 3VG microglass
  - 10P paper
- **filter element collapse rating:**
  - 16 = Δp 232 PSI
- **filter element design:**
  - E = without by-pass valve
  - S = with by-pass valve Δp 29 PSI
- **sealing material:**
  - P = Nitrile (NBR)
  - V = Viton (FPM)
- **filter element specification:**
  - = standard
  - IS06 = for HFC application, see sheet no. 31601
- **process connection:**
  - UG = thread connection
- **process connection size:**
  - 5 = -16 SAE
- **filter housing specification:**
  - = standard
  - IS06 = for HFC application, see sheet no. 31605
  - IS10 = for ATEX, see sheet no. 68267
- **clogging indicator at M1:**
  - = without
  - O = visual, see sheet no. 1616
  - E1 = pressure switch, see sheet no. 1616
  - E2 = pressure switch, see sheet no. 1616
  - E5 = pressure switch, see sheet no. 1616
  - PA = ground connection
- **clogging indicator at M2:**
  - = without
  - 1 = with oil separator

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>01E</td>
<td>210</td>
<td>10VG</td>
<td>16</td>
<td>S</td>
<td>P</td>
<td>-</td>
</tr>
</tbody>
</table>

- **series:**
  - 01E = filter element according to company standard
- **nominal size:** 210, 320
- **-** see type index-complete filter
Technical data:

- **operating temperature:** +14 °F to +212 °F
- **operating medium:** mineral oil, other media on request
- **max. operating pressure:** 145 PSI
- **opening pressure by-pass valve:** 29 PSI
- **process connection:** thread connection
- **housing material standard:** filter head AL, screw plug / filter bowl glass fibre reinforced polyamide
- **housing material IS100, category 2 and 3:** filter head AL, screw plug / filter bowl carbon fibre reinforced polyamide
- **sealing material:** Nitrile (NBR) or Viton (FPM), other materials on request
- **installation position:** vertical

Classified under the Pressure Equipment Directive 2014/68/EU for mineral oil (fluid group 2), Article 4, Para. 3.
Classified under ATEX Directive 2014/34/EU according to specific application (see questionnaire sheet no. 34279-4).

Pressure drop flow curves:

**Filter calculation/sizing**

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

\[ \Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element} \]

\[ \Delta p_{housing} = \text{(see } \Delta p = f(Q) \text{ - characteristics)} \]

\[ \Delta p_{element} (\text{PSI}) = Q (\text{GPM}) \times \frac{\text{MSK}}{1000} \times \text{v(SUS)} \times \frac{\rho}{0.876} \left( \frac{\text{kg}}{\text{dm}^3} \right) \]

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

**Material gradient coefficients (MSK) for filter elements**

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

<table>
<thead>
<tr>
<th>TEFB</th>
<th>VG</th>
<th>G</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3VG</td>
<td>6VG</td>
<td>10VG</td>
</tr>
<tr>
<td>210</td>
<td>1.600</td>
<td>1.111</td>
<td>0.711</td>
</tr>
<tr>
<td>310</td>
<td>1.148</td>
<td>0.797</td>
<td>0.510</td>
</tr>
</tbody>
</table>

\[ \Delta p = f(Q) \text{ – characteristics according to ISO 3968} \]

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.

![TEFB.210/310 Housing Pressure Drop](image)
Symbols:

without indicator

with by-pass valve

visual O

electric contact maker E1

electric contact breaker E5

electric contact maker/breaker E2

Spare parts:

<table>
<thead>
<tr>
<th>item</th>
<th>qty.</th>
<th>designation</th>
<th>dimension</th>
<th>article-no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>filter element</td>
<td>01.E 210…</td>
<td>304403 (NBR)</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>filter head</td>
<td>TNR 100</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>filter bowl</td>
<td>NG 210</td>
<td>304991 (NBR)</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>filter cover</td>
<td>M 92 x 3</td>
<td>304403 (NBR)</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>O-ring</td>
<td>82 x 3,5</td>
<td>304403 (NBR)</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>O-ring</td>
<td>75 x 3</td>
<td>304403 (NBR)</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>O-ring</td>
<td>95 x 3</td>
<td>304403 (NBR)</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>O-ring</td>
<td>40 x 3</td>
<td>304403 (NBR)</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>spring</td>
<td>DA = 52</td>
<td>305053</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>oil separator</td>
<td></td>
<td>321084</td>
</tr>
<tr>
<td>11</td>
<td>1</td>
<td>gasket (with execution oil separator)</td>
<td>2 thick</td>
<td>325389</td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>filter element breather</td>
<td>01BFE.120</td>
<td>301866</td>
</tr>
<tr>
<td>13</td>
<td>1</td>
<td>protection cap</td>
<td></td>
<td>303048</td>
</tr>
<tr>
<td>14</td>
<td>1</td>
<td>clip</td>
<td></td>
<td>303046</td>
</tr>
<tr>
<td>15</td>
<td>1</td>
<td>clogging indicator electrical</td>
<td>E1, E2 or E5</td>
<td>301721</td>
</tr>
<tr>
<td>16</td>
<td>1</td>
<td>clogging indicator visual</td>
<td>O</td>
<td>301721</td>
</tr>
</tbody>
</table>

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941  Verification of collapse/burst resistance
ISO 2942  Verification of fabrication integrity
ISO 2943  Verification of material compatibility with fluids
ISO 3723  Method for end load test
ISO 3724  Verification of flow fatigue characteristics
ISO 3968  Evaluation of pressure drop versus flow characteristics
ISO 16889  Multi-pass method for evaluating filtration performance