Vacuum filter for large flow vacuum generator and vacuum pump

High flow vacuum filter

Characteristics

- **Flow rate**: 12.7 scfm (360 ℓ/min[ANR])
  
  Large capacity enables to secure **high processing flow rate**.

- **Four** types of micron rating can be selected according to applications.
  - Filtration accuracy: 1 μm, 5 μm, 10 μm, 200 μm

- **Various** types of connections.
  - Taper pipe female thread, Parallel pipe female thread and Push-in fitting are available.
Model designation (Example)

VFL360 - 16 - 10M -

①. Connection type and size
- Push-in fitting (mm) - Taper pipe female thread - Parallel pipe female thread

<table>
<thead>
<tr>
<th>Code</th>
<th>10</th>
<th>12</th>
<th>16</th>
<th>03</th>
<th>04</th>
<th>06</th>
<th>G3</th>
<th>G4</th>
<th>G6</th>
</tr>
</thead>
</table>

High flow vacuum filter

Model designation of filter element (Example)

VFE360 - 10M

①. Filtration accuracy

<table>
<thead>
<tr>
<th>Code</th>
<th>1M</th>
<th>5M</th>
<th>10M</th>
<th>200M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filtration accuracy (µm)</td>
<td>1</td>
<td>5</td>
<td>10</td>
<td>200</td>
</tr>
</tbody>
</table>

Replacement filter element for VFL360

Model designation of replacement parts (Example)

VFL B 360

①. Replacement parts

<table>
<thead>
<tr>
<th>Code</th>
<th>B</th>
<th>D</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parts</td>
<td>Bracket</td>
<td>Deflector</td>
<td>Baffle</td>
</tr>
</tbody>
</table>

Large flow vacuum filter

O-ring

*No lubricant is on this O-ring. To improve its assemblability, apply lubricant like grease when necessary.
Recommended lubricant: Fluorine-based grease

Specifications

<table>
<thead>
<tr>
<th>Fluid medium</th>
<th>Air</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating pressure range</td>
<td>-29.8 ~ 0 inHg (-101 ~ 0 kPa)</td>
</tr>
<tr>
<td>Filtration accuracy</td>
<td>1, 5, 10, 200µm (Trapping efficiency: 95%)</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>32 ~ 140°F (0 ~ 60°C) (No freezing)</td>
</tr>
<tr>
<td>Filter area</td>
<td>10 in² (64.4 cm²)</td>
</tr>
<tr>
<td>Processing flow rate (*1)</td>
<td>12.7 scfm (360 l/min [ANR])</td>
</tr>
<tr>
<td>Bowl capacity</td>
<td>5.5 in³ (90 cm³)</td>
</tr>
<tr>
<td>Blow-off pressure (*2)</td>
<td>14 psi (0.1 MPa) or less</td>
</tr>
</tbody>
</table>

*1. Processing flow rate with the conditions under filtration accuracy: 5µm and pressure loss: 3kPa of a representative filter.
*2. Allowable internal pressure when a momentary positive pressure is applied for blow-off purpose.
**Construction**

<table>
<thead>
<tr>
<th>No.</th>
<th>Parts</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>①</td>
<td>Resin body</td>
<td>PBT</td>
</tr>
<tr>
<td>②</td>
<td>Bowl</td>
<td>PC</td>
</tr>
<tr>
<td>③</td>
<td>Deflector</td>
<td>POM</td>
</tr>
<tr>
<td>④</td>
<td>Baffle</td>
<td>POM</td>
</tr>
<tr>
<td>⑤</td>
<td>Bracket</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>⑥</td>
<td>Bracket fixing screw</td>
<td>Steel (nickel plated)</td>
</tr>
<tr>
<td>⑦</td>
<td>Fixing pin</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>⑧</td>
<td>O-ring</td>
<td>Special NBR</td>
</tr>
<tr>
<td>⑨</td>
<td>Fitting cartridge</td>
<td>Aluminum</td>
</tr>
<tr>
<td>⑩</td>
<td>Filter element</td>
<td>PE + PP(*)</td>
</tr>
<tr>
<td>⑪</td>
<td>Spring</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>⑫</td>
<td>Lock clip</td>
<td>POM</td>
</tr>
<tr>
<td>⑬</td>
<td>O-ring</td>
<td>NBR</td>
</tr>
</tbody>
</table>

*PP for filtration accuracy : 200㎛ .

**Piping example**

① Connecting with a vacuum generator
High flow vacuum filter removes dust particles and prevent the failure of high flow vacuum generator, by being installed close to high flow vacuum generator.

② Connecting with a vacuum pump
High flow vacuum filter removes dust particles and prevent the failure of vacuum pump, by being installed close to vacuum pump.
Safety instruction manual

\section*{Warnings}

1. Avoid tensile strength or moment load on the product body and the fitting cartridge. It may damage the product.
2. Carry out the maintenance of filter element periodically. There is a possibility of dropping the performance or causing troubles by clogging of the filter element. Before replacing the filter element, make sure to read “How to remove the dust in bowl and replace a filter element” carefully, release pressure and retain atmospheric pressure condition in the filter.
3. This product is not designed to be explosion-proof. Do not apply any positive pressure except momentary pressure for blow-off. It may cause damage to the product and cause injury.
4. Bowl material is polycarbonate. Avoid chemicals or atmosphere with chemicals listed in the table-1 below. The bowl may get broken and injure human body.

\section*{Cautions}

1. Rust and foreign substances in a piping may cause damage, malfunction or performance drop of the product. Flushing before use and periodic flushing of a piping are recommended. Flushing on a fitting type filter shall be done with a stem or short cut tube inserted into a fitting. Sealing parts in the fitting may fly out of it.
2. Check the arrow \( \supset (\text{IN} \rightarrow \text{OUT}) \) marking on a filter before installing. Installation with a wrong direction does not fulfill the filter performance.
3. Lock the bowl properly and make sure that there is no vacuum leakage after removing dust or replacing a filter element.
4. Keep dust particles or drain water in a bowl lower than “MAX. DRAIN LEVEL” marking on it. Airflow may fling up the dust in the bowl, causing a significant reduction of the filter element lifetime.
5. Hold a hex. part on each port by a spanner wrench, when connecting a fitting with male thread, to prevent co-rotation of each port. Refer to the tightening torque in the Table-2.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|}
\hline
Thread type & Thread size & Tightening torque \thead{N·m} \\
\hline
Taper pipe thread & R3/8 & 12.5–14.5 \\
& R1/2 & 20–22 \\
& R3/4 & 30–35 \\
\hline
Parallel pipe thread & G3/8 & Follow the tightening torque of male thread \\
& G1/2 & \\
& G3/4 & \\
\hline
\end{tabular}
\caption{Tightening torque (Reference)}
\end{table}

6. Install or fix the product with its bowl facing down and vertically.
7. Re-torque the bracket fixing screws periodically.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|}
\hline
Chemical type & Classification & Chemicals (Major chemicals only) & Applications \\
\hline
Inorganic compound & Acid & Hydrochloric acid, Sulfuric acid, Nitric acid, Hydrofluoric acid, Chromic acid, etc. & Metal pickling solution, Acid cleaning liquid, Coating treatment liquid, etc. \\
& Alkali & Alkaline substances like Sodium hydroxide, Caustic potash, Slaked lime, Aqueous ammonia, Sodium carbonate, etc. & Alkaline cleaning liquid for metal \\
& Inorganic salt & Sodium sulphate, Potassium nitrate, Potassium bromide, Sodium nitrate, etc. & \\
& Aromatic hydrocarbon & Benzene, Toluene, Xylene, Ethylbenzene, Styrene, etc. & Contained in paint thinner (Benzene, Toluene, Xylene) \\
& Aliphatic hydrocarbon & Methyl chloride, Ethylene chloride, Methylene chloride, Acetylene chloride, Chloroform, Tricene, Perchloroethylene, Carbon tetrachloride, etc. & Organic solvent-based cleaning liquid for metal (Tricene, Perchloroethylene, Carbon tetrachloride, etc) \\
& Aromatic hydrocarbon & Chlorobenzene, Dichlorobenzene, Benzenehexachloride (B.H.C), etc. & Agrochemical \\
& Petroleum components & Solvent, Naphtha, Gasoline & \\
& Alcohol & Methyl alcohol, Ethyl alcohol, Cyclohexanol, Benzyl alcohol & Used as anti-freezing agent. \\
& Phenol & Carboxylic acid, Cresol, Naphthal, etc. & Disinfectants \\
& Ether & Methyl ether, Methyl ethyl ether, Ethyl ether, etc. & Brake oil additive \\
& Ketone & Acetone, Methyl ethyl ketone, Cyclohexanone, Acetophenone, etc. & \\
& Carboxylic acid & Formic acid, Acetic acid, Butyric acid, Acrylic acid, Oxalic acid, Phthalic acid, etc. & Yeing agent. Oxalic acid for treatment agent of Aluminum, Phthalic acid for paint plasticizer. \\
& Organophosphates & Dimethyl phthalate (DMP), Diethyl phthalate (DEP), Dibuty phthalate (DBP), Dioctyl phthalate (DOP) & Grease, Synthetic hydraulic oil, Rust preventive oil additive, Used as synthetic resin plasticizer. \\
& Oxoacid & Glycolic acid, Lactic acid, Malic acid, Citric acid, Tartric acid & \\
& Nitro compound & Nitromethane, Nitroethane, Nitroethylene, Nitrobenzene, etc. & \\
& Amine & Methylamine, Dimethylamine, Ethyl amine, Aniline, Acetaniline, etc. & Brake oil additive \\
& Nitrile & Acetonitrile, Acrylic nitrile, Benzonitrile, Aceto isonitrile, etc. & Material of Nitrile rubber \\
\hline
\end{tabular}
\caption{Chemicals to be avoided}
\end{table}
How to install

Install the bracket and filter body as shown below (Fixing torque of the bracket and filter body : 3.5N・m). Use M5 screws to install the bracket through mounting holes on it. See appearance drawings below for the mounting hole pitch.

Appearance drawing

Connection type : Push-in fitting

Connection type : Taper pipe female thread

Connection type : Parallel pipe female thread

Secure a space for maintenance as above when installing or fixing the product. 

http://www.pisco.com
Pressure loss chart

Element: 1µm

Flow rate (ℓ/min[ANR])

Pressure loss (MPa)

- VFL360-10-1M
- VFL360-03-1M, VFL360-G3-1M, VFL360-12-1M
- VFL360-04-1M, VFL360-G4-1M, VFL360-16-1M
- VFL360-06-1M, VFL360-G6-1M

Element: 5µm

Flow rate (ℓ/min[ANR])

Pressure loss (MPa)

- VFL360-10-5M
- VFL360-03-5M, VFL360-G3-5M, VFL360-12-5M
- VFL360-04-5M, VFL360-G4-5M, VFL360-16-5M
- VFL360-06-5M, VFL360-G6-5M

Element: 10µm

Flow rate (ℓ/min[ANR])

Pressure loss (MPa)

- VFL360-10-10M
- VFL360-03-10M, VFL360-G3-10M, VFL360-12-10M
- VFL360-04-10M, VFL360-G4-10M, VFL360-16-10M
- VFL360-06-10M, VFL360-G6-10M
How to remove the dust in bowl and replace a filter element

① Turn the bowl to the arrowed direction (①-2) while pushing down the lock clip (①-1).
   Align the marking on lock clip to the one on body.
② Pull down the bowl to detach it from the body.
③ Turn the deflector to the arrowed direction to align its OPEN ▽ marking to △ marking on the bowl.
④ Detach the deflector from the bowl and take out the filter element from the bowl.
⑤ Take out the baffle from the filter element. (Only for replacement of filter element)
⑥ Remove dust from the bowl and replace the filter element.
⑦ Attach the baffle to the new filter element.
⑧ Place the filter element vertically in the bowl and confirm that the O-ring is on the right position. Attach the deflector to the bowl with its OPEN ▽ marking aligned with △ marking on the bowl. Then turn the deflector to align its LOCK ▽ marking to △ marking on the bowl.
⑨ Insert the bowl to the body with the marking on the lock clip aligned with the marking on the body. Turn the bowl until the lock clip goes up and lock with a click.

![Diagram of the process](http://www.pisco.com)
Dust and drains are removed via the filters’ cyclone effect and filter element. (Large Capacity Type: VFB and VFR)

Large capacity plastic bowl reduces maintenance/emptying frequency. (Large Capacity Bowl Type: VFR)

Easy detachment of dome cartridge eliminates scattered dust and debris messes. (Large Capacity In-Line Dome Type: VFB)

Small vacuum filter is suitable for high-cycle vacuum operation. (Small In-Line Type: VFU0&1)

There are 2 element length sizes available, depending on volume or exchange period of the element. (Small In-Line Type: VFU1)

PP resin material allows for a low price Plug-In vacuum filter. (Plug-in Type: VFJ)

Selections (VFU1,2,3) added for “Copper alloy free” and “low ozone measure”. 