High Pressure Filters

HD 417 • HD 617
- Bi-directional flow
- In-line mounting
- Operating pressure up to 500 bar
- Nominal flow rate up to 420 l/min
Description

Application
In the high pressure circuits of hydraulic systems with changing flow direction.

Performance features
Protection against wear: By means of filter elements that, in full-flow filtration, meet even the highest demands regarding cleanliness classes.

Protection against malfunction: Through installation near to the control valves or other expensive components. The specific determined flow rate guarantees a closed by-pass valve even at \( v \leq 200 \text{ mm}^2/\text{s} \) (cold start condition).

Special features
Reverse flow valves: The "Graetz" system (see Symbols) integrated into the head piece ensures the filtration of the hydraulic fluid in both flow directions.

Filter elements
Flow direction from outside to centre. The star-shaped pleating of the filter material results in:
• large filter surfaces
• low pressure drop
• high dirt-holding capacities
• long service life

Filter maintenance
By using a clogging indicator the correct moment for maintenance is stated and guarantees the optimum utilization of the filter life.

Materials
Filter head: Spheroidal graphite cast iron (SGI)
Filter bowl: Cold extruded steel
Coating: Powder paint
Seals: NBR (FPM on request)
Filter media: EXAPOR® MAX 2 - inorganic multi-layer microfibre web
Paper - cellulose web, impregnated with resin

Accessories
Electrical and/or optical clogging indicators are available - optionally with one or two switching points resp. temperature suppression.

Characteristics

Operating pressure
0 ... 315 bar, min. 2 \( \times 10^6 \) pressure cycles
Nominal pressure according to DIN 24550

0 ... 500 bar, min. 10^6 pressure cycles
Quasi-static operating pressure

Permissible pressures for other numbers of cycles

Nominal flow rate
Up to 420 l/min (see Selection Chart, column 2)
The nominal flow rates indicated by ARGO-HYTOS are based on the following features:
• closed by-pass valve at \( v \leq 200 \text{ mm}^2/\text{s} \)
• element service life > 1,000 operating hours at an average fluid contamination of 0,07 g per l/min flow volume
• flow velocity in the connection lines:
  up to 250 bar ≤ 8 m/s
  > 250 bar ≤ 12 m/s

Filter fineness
5 \( \mu \text{m}(c) \) ... 30 \( \mu \text{m}(c) \)
\( \beta \)-values according to ISO 16889
(see Selection Chart, column 4 and diagram Dx)

Dirt-holding capacity
Values in g test dust ISO MTD according to ISO 16889
(see Selection Chart, column 5)

Hydraulic fluids
Mineral oil and biodegradable fluids
(HAES and HEG, see info-sheet 00.20)

Temperature range
- 30°C ... + 100°C (temporary - 40°C ... + 120°C)

Viscosity at nominal flow rate
• at operating temperature: \( v < 60 \text{ mm}^2/\text{s} \)
• as starting viscosity: \( \nu_{\text{max}} = 1,200 \text{ mm}^2/\text{s} \)
• at initial operation: The recommended starting viscosity can be read from the diagram D (pressure drop as a function of the kinematic viscosity) as follows: Find the 70 % \( \Delta p \) of the cracking pressure of the by-pass valve on the vertical axis. Draw a horizontal line so that it intersects the \( \Delta p \) curve at a point. Read this point on the horizontal axis for the viscosity.

Mounting position
Preferably vertical, filter head on top

Connection
SAE-flange (6000 psi). Sizes see Selection Chart, column 6
Filter fineness curves in Selection Chart, column 4

**Dx** Filtration ratio $\beta$ as a function of particle size $x$ obtained by the Multi-Pass Test according to ISO 16889

The abbreviations represent the following $\beta$-values resp. finenesses:

**For EXAPOR® MAX 2- and Paper elements:**
- $5\text{EX2} = \beta_{5\text{EX2}} = 200$ EXAPOR® MAX 2
- $7\text{EX2} = \beta_{7\text{EX2}} = 200$ EXAPOR® MAX 2
- $10\text{EX2} = \beta_{10\text{EX2}} = 200$ EXAPOR® MAX 2
- $16\text{EX2} = \beta_{16\text{EX2}} = 200$ EXAPOR® MAX 2
- $30\text{P} = \beta_{30\text{P}} = 200$ Paper

Based on the structure of the filter media of the 30P paper elements, deviations from the printed curves are quite probable.

**For screen elements:**
- $40\text{S} = $ screen material with mesh size 40 µm
- $60\text{S} = $ screen material with mesh size 60 µm
- $100\text{S} = $ screen material with mesh size 100 µm

Tolerances for mesh size according to DIN 4189

For special applications, finenesses differing from these curves are also available by using special composed filter media.
### Selection Chart

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Nominal flow rate</th>
<th>Pressure drop see diagram</th>
<th>Filter fineness see diagram</th>
<th>Dirt holding capacity</th>
<th>Cracking pressure of by-pass</th>
<th>Replacement filter element</th>
<th>Clogging indicator</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>l/min</td>
<td>g</td>
<td>bar</td>
<td>kg</td>
<td>Part No. (Basic)</td>
<td>Weight</td>
<td></td>
<td></td>
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<tr>
<td>HD 417-149</td>
<td>150</td>
<td>D1,2,3/1</td>
<td>5EX2</td>
<td>29</td>
<td>SAE 1¼</td>
<td>3</td>
<td>V3.0823-13²</td>
<td>optional</td>
</tr>
<tr>
<td>HD 417-179</td>
<td>220</td>
<td>D1,2,3/2</td>
<td>5EX2</td>
<td>33</td>
<td>SAE 1¼</td>
<td>7</td>
<td>1</td>
<td>V3.0823-03</td>
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<td>260</td>
<td>D1,2,3/3</td>
<td>10EX2</td>
<td>33</td>
<td>SAE 1¼</td>
<td>3</td>
<td>V3.0823-16²</td>
<td>optional</td>
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<tr>
<td>HD 417-176</td>
<td>320</td>
<td>D1,2,3/4</td>
<td>10EX2</td>
<td>47</td>
<td>SAE 1¼</td>
<td>1</td>
<td>V3.0823-06</td>
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<tr>
<td>HD 417-168</td>
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<td>D1,2,3/5</td>
<td>16EX2</td>
<td>48</td>
<td>SAE 1¼</td>
<td>7</td>
<td>1</td>
<td>V3.0823-08</td>
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<td>HD 417-161</td>
<td>350</td>
<td>D1,2,3/6</td>
<td>30P</td>
<td>26</td>
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<td>1</td>
<td>P3.0823-01³</td>
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<td>5EX2</td>
<td>41</td>
<td>SAE 1½</td>
<td>3</td>
<td>V3.0833-13²</td>
<td>optional</td>
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<tr>
<td>HD 617-179</td>
<td>280</td>
<td>D1,2,3/2</td>
<td>5EX2</td>
<td>49</td>
<td>SAE 1½</td>
<td>7</td>
<td>1</td>
<td>V3.0833-03</td>
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<tr>
<td>HD 617-146</td>
<td>320</td>
<td>D1,2,3/3</td>
<td>10EX2</td>
<td>49</td>
<td>SAE 1½</td>
<td>3</td>
<td>V3.0833-16²</td>
<td>optional</td>
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<td>HD 617-176</td>
<td>380</td>
<td>D1,2,3/4</td>
<td>10EX2</td>
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<td>HD 617-161</td>
<td>420</td>
<td>D1,2,3/6</td>
<td>30P</td>
<td>34</td>
<td>SAE 1½</td>
<td>7</td>
<td>1</td>
<td>P3.0833-01³</td>
</tr>
</tbody>
</table>

Optical or electrical indicators are available to monitor the clogging condition of the element. If the indicator should be already mounted onto the filter head use the abbreviation “M” behind the part number of the indicator. The printed order acknowledgements show both items separately.

**Order example:** The filter HD 417-149 has to be supplied with electrical clogging indicator - cracking pressure 5,0 bar

**Order description:**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>(Basic unit)</th>
<th>DG 041-33</th>
<th>Mounted</th>
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<tbody>
<tr>
<td>HD 417-149</td>
<td>/</td>
<td>M</td>
<td></td>
</tr>
</tbody>
</table>

**Clogging indicator** ____________

**For the appropriate clogging indicators see catalogue sheet 60.30.**

**Remarks:**

- Filter versions without by-pass valves must always be equipped with a clogging indicator.
- The filters listed in this chart are standard filters. Other designs available on request.

1. Element differential pressure up to 160 bar
2. Clogging indicator is obligatory
3. Paper media supported with metal gauze
**Dimensions**

Version with electrical clogging indicator DG 041

Minimum distance from ferromagnetic parts: 7 mm

Clogging indicator optional: Pressure holes plugged with screws

**Measurements**

<table>
<thead>
<tr>
<th>Type</th>
<th>A/B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>K</th>
<th>L Ø/depth</th>
<th>M</th>
<th>N</th>
<th>O</th>
<th>P</th>
<th>Q</th>
<th>R Ø/depth</th>
<th>S</th>
<th>T</th>
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<tr>
<td>HD 417</td>
<td>SAE1¼</td>
<td>31,5</td>
<td>328</td>
<td>58</td>
<td>87,5</td>
<td>156</td>
<td>108</td>
<td>80</td>
<td>32</td>
<td>66,7</td>
<td>M 14/22</td>
<td>31,8</td>
<td>73</td>
<td>102</td>
<td>87</td>
<td>100</td>
<td>12/18</td>
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<tr>
<td>HD 617</td>
<td>SAE1½</td>
<td>31,5</td>
<td>428</td>
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<td>102</td>
<td>87</td>
<td>100</td>
<td>12/18</td>
<td>138</td>
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</tbody>
</table>

**Symbols**

1

2

3

4

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Our engineers will be glad to advice you in questions concerning filter application, selection as well as the cleanliness class of the filtered medium attainable under practical operating conditions.

Illustrations may sometimes differ from the original. ARGO-HYTOS is not responsible for any unintentional mistake in this specification sheet.