

Coalescer Filter

PiW 2175

1. Features

The Coalescer filter has been specially designed to separate water from hydraulic fluids, diesel and marine diesel oil.

According to VDMA standard sheet 24568, the amount of water in HE pressure fluids has to be kept below 1000 ppm (0.1 %). HLP fluids should not contain any free water at all. Free water always causes turbidity which can be seen by the human eye. Physically, turbidity is a two-phase mixture (emulsion) in which small droplets of water are present in the pressure fluid. For this reason, it is advisable to carry out a mechanical separation of these water droplets; this technique is based on the coalescer - principle. The droplets are collected in various layers and brought together into larger units. The water drops thus formed are several millimetres in diameter.

After leaving the coalescer layer, the drops come in contact with a special hydrophobic fabric, where the separation from the pressure fluid takes place. The water is removed from the circuit by means of sedimentation. It is important that a certain differential pressure is not exceeded during the process. The viscosity also needs to be taken into account to ensure proper operation. The maximum viscosity for effective water separation is approx. 68 mm²/s. The coalescer works best if the pressure fluids contain a minimal amount of emulsifying additives. The bottom line: in systems that are frequently at risk for water ingress, expensive special oils can be replaced by simple, cost-effective pressure fluids.

Characteristics:

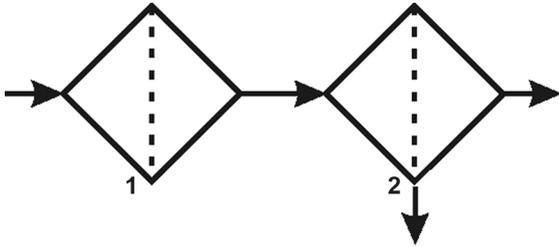
- Mechanical separation of water droplets - coalescer principle
- Water removing by means of sedimentation
- Expensive special oils can be replaced by simple, cost-effective pressure fluids
- Worldwide distribution



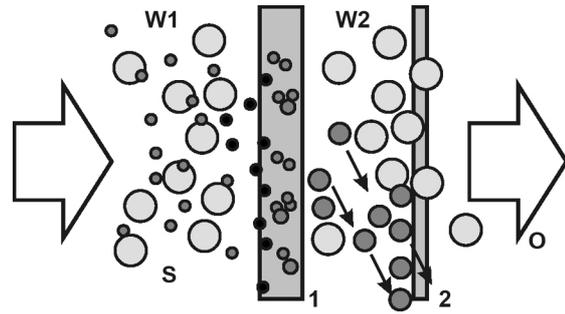
2. Functional description

2.1 Principle of the process

Liquid flows through the coalescer element. Minute water droplets "coalesce" there to form larger drops and any impurities are retained. These large drops then sink to the bottom and are guided to the water drain by a hydrophobic cloth.



1 = Coalescer
2 = Droplet separator



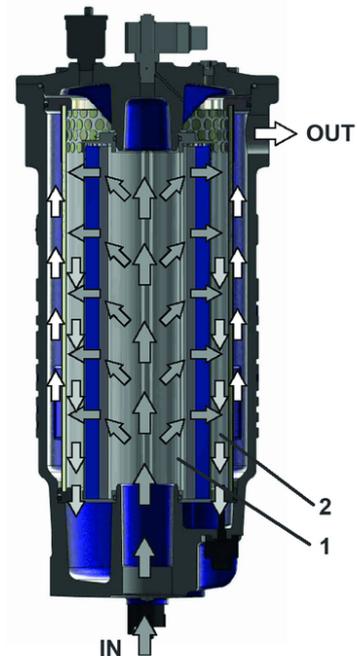
W1 = little droplets
W2 = large droplets
1 = Coalescer
2 = Droplet separator
O = Öl

2.2 Main components



① Maintenance indicator
② Vent screw / air release valve (optional)
③ Cover
④ Housing
⑤ 2 water level sensors

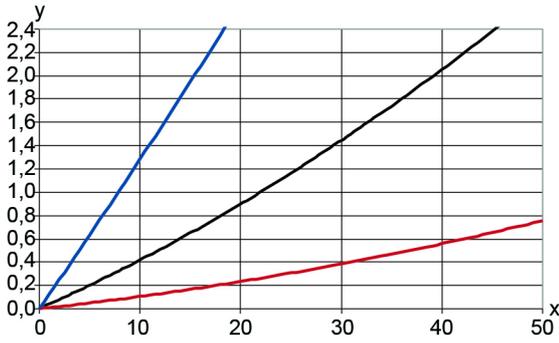
2.3 Functional description



- Dirty liquid flows into the housing (IN).
- The water droplets coalesce to form larger drops and any impurities are retained by the coalescer element (depth filter).
- Water is separated by the hydrophobic cloth and collects in a reservoir at the bottom of the filter housing.
- Clean liquid flows through the outlet (OUT).

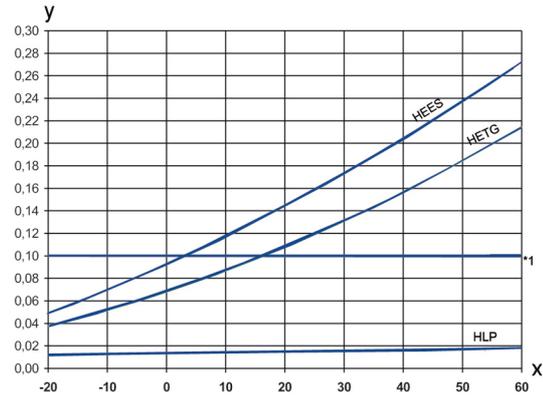
3. Flow rate

— 500 mm²/s
— 190 mm²/s
— 33 mm²/s



y = differential pressure in bar
 x = flow rate in l/min

4. Water solubility



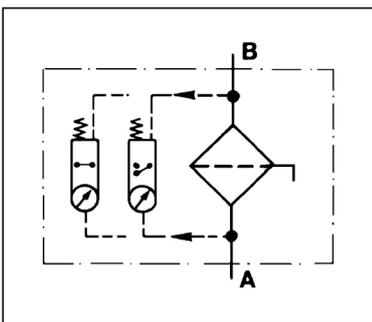
x = temperature in °C
 y = water solubility (%)
 *1 VDMA-threshold

5. Quality assurance

Filtration Group filters and filter elements are produced according to the following international standards:

| Norm | Designation |
|--------------|---|
| DIN ISO 2941 | Hydraulic fluid power filter elements; verification of collapse/burst resistance |
| DIN ISO 2942 | Hydraulic fluid power filter elements; verification of fabrication integrity |
| DIN ISO 2943 | Hydraulic fluid power filter elements; verification of material compatibility with fluids |
| DIN ISO 3723 | Hydraulic fluid power filter elements; method for end load test |
| DIN ISO 3724 | Hydraulic fluid power filter elements; verification of flow fatigue characteristics |
| ISO 3968 | Hydraulic fluid power filters; evaluation of pressure drop versus flow characteristics |
| ISO 10771.1 | Fatigue pressure testing of metal containing envelopes in hydraulic fluid applications |
| ISO 16889 | Hydraulic fluid power filters; multipass method for evaluation filtration performance of a filter element |

6. Symbol



7. Order numbers

Example for ordering filters:

| 1. Filter housing | 2. Filter element |
|---|--|
| complete with visual/electrical maintenance indicator, droplet separator and coalescer element Type: PiW 2175 Order number: 72356609 | Type: KE 2629 E1 COA Order number: 76361281 |

8. Technical specifications

| | |
|---|--|
| Design: | in-line filter |
| Nominal pressure: | 16 bar (230 psi) |
| Test pressure: | 24 bar (340 psi) |
| Temperature range: | +5 °C to +90 °C (other temperature ranges on request) |
| Filter housing material: | nodular cast iron |
| Sealing material: | NBR |
| Water collection chamber: | approx. 2 l |
| Maintenance indicator setting: | Δp 2.2 bar \pm 0,2 bar |
| Electrical data of maintenance indicator: | |
| Max. voltage: | 250 V AC/200 V DC |
| Max. current: | 1 A |
| Contact load: | 70 W |
| Type of protection: | IP 65 in inserted and secured status |
| Contact: | normally open/closed |
| Cable sleeve: | M20x1.5 |

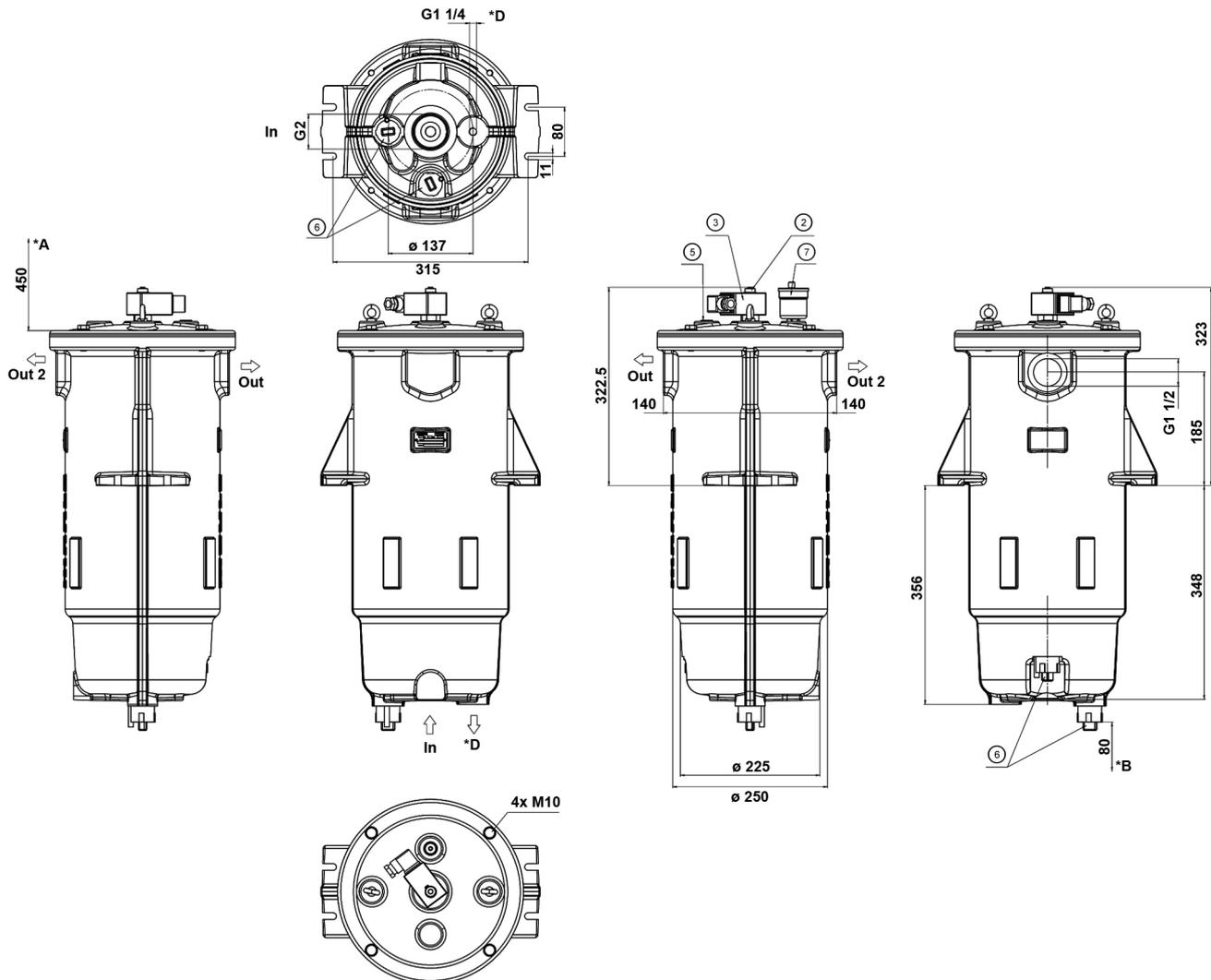
The switching function can be changed by turning the electric upper part by 180° (normally closed contact or normally open contact). The state on delivery is a normally closed contact. By inductivity in the direct current circuit the use of suitable protection circuit should be considered. Further maintenance indicator details and designs are available in the maintenance indicator data sheet.

We draw attention to the fact that all values indicated are average values and do not always occur in specific cases of application. Our products are continually being further developed. Values, dimensions and weights can change as a result of this. Our specialized department will be pleased to offer you advice.

We recommend you to contact us concerning applications of our filters in areas governed by the EU Directive 94/9 EC (ATEX 95). The standard version can be used for liquids based on mineral oil (corresponding to the fluids in Group 2 of Directive 97/23 EC Article 9). If you consider to use other fluids please contact us for additional support.

Subject to technical alteration without prior notice.

9. Dimensions



9.1 Caption for dimensions

| | | | |
|-------|---------------------------------------|---|--|
| In | Inlet | ② | Maintenance indicator visual |
| Out | Outlet | ③ | Maintenance indicator electrical upper section |
| Out 2 | Outlet optional | ⑤ | Vent screw (30 Nm) |
| *A | Clearance required for filter element | ⑥ | Water level sensors |
| *B | Clearance required for wires | ⑦ | Air release valve optional |
| *D | Water drain | | |

10. Installation, operating and maintenance instructions

10.1 Filter installation

When installing the filter make sure that sufficient space is available to remove filter element and filter housing. Install filter vertical so that the separated water can flow down and can be discharged.

10.2 Connecting the electrical maintenance indicator

The electrical indicator is connected via a 2-pole appliance plug according to DIN EN 175301-803 with poles marked 1 and 2. The electrical section can be inverted to change from normally open position to normally closed position or vice versa.

10.3 Operating instruction

The max. viscosity for an effective water separation should not exceed 68 mm²/s. The coalescer should run with a differential pressure of approx. 0.3 bar, that means that the volumetric flow is determined by the viscosity of the oil. The separated water will be collected in the PiW 2175 (max. 2 l). The Water can be discharged automatically by using the water level sensor. In order to recognize the separated water, a transparent water-detection device with a tap or so called warning indicator should be mounted.

Remark: Please note permissible operating pressure of the housing.

10.4 When should the coalescer element be replaced?

A differential pressure indicator with a switching level of Δp 2.2 bar is mounted at the top of the filter housing. During cold starts, the indicator may give a warning signal. Press the red button of the visual indicator once again only after operating temperature has been reached. If the red button immediately pops up again and/or the electrical signal has not switched off after reaching operating temperature, the coalescer must be replaced after the end of the shift.

As already mentioned above, the filter should run at Δp of approx. 0.3 bar. The flow rate/pressure drop curves show the flow rates according to the viscosity. If the indicator may give a warning signal, the coalescer element have to be changed.

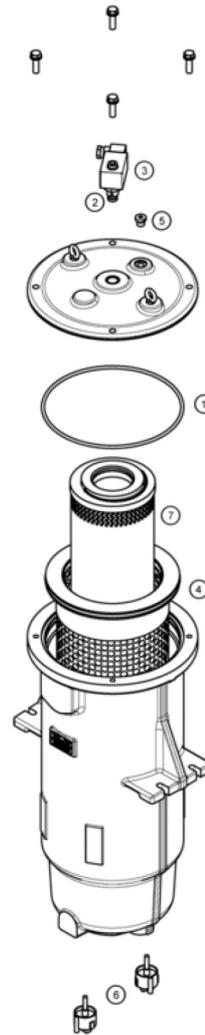
10.5 Element replacement

Stop system and relieve filter from pressure. Use the water tap to empty the housing. Unscrew the cover and change the coalescer element. Check seals in the lid-cover for possible damages, replace if necessary. Place the top cover back on top of the housing and tighten it. Close the water tap.

The venting occurs by a venting screw. Tighten the venting screw when the fluid flows out of the venting bore.

11. Spare parts list

| Order numbers of spare parts | | |
|------------------------------|--|--------------|
| Position | Type | Order number |
| ① ② ⑤ | Seal kit for filter housing incl. visual maintenance indicator and venting screw | 72348122 |
| | Maintenance indicator | |
| ③ | Electrical PiS 3092/2.2 | 77669856 |
| | Electrical upper section only | 77536550 |
| ④ | Droplet separator | 72356964 |
| ⑥ | Water level sensor | 72348133 |
| ⑦ | Coalescer element | 76361281 |



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