

# Filter elements for microfiltration

## Type 46. CELLUDISC filter elements

**RE 51470**

Edition: 2014-08



HAD7818\_d

- ▶ Size: 10"
- ▶ Maximum pressure differential: 5 bar [73 psi]
- ▶ Filter rating: 2 and 10  $\mu\text{m}$
- ▶ Operating temperature: +10 °C to +80 °C [+50°F to +176°F]

### Features

CELLUDISC filter elements are used for the microfiltration of hydraulic and lubrication oil, preferably as a bypass filter.

They distinguish themselves by the following:

- ▶ Modular structural design consisting of 16 structurally identical cells
- ▶ Support tube in one-piece design
- ▶ Metal-free version
- ▶ Filter material made from compressed cellulose fiber
- ▶ Filter auxiliary materials to support the filtration process
- ▶ Support structure made from polypropylene
- ▶ Filter cells with spacers to avoid blocking
- ▶ High dirt holding capacity due to depth filtration.

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## Filter element ordering code

### Filter element type 46.

01	02	03	04	05	06
<b>46.</b>	<b>10</b>	-	<b>S00</b>	-	<b>0</b>
					<b>M</b>

### Filter element

01	Design	<b>46.</b>
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### Size

02	According to <b>Bosch Rexroth standard</b>	<b>10</b>
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### Filter rating

03	<b>Glass fiber material</b> , not cleanable	<b>Z02</b>
		<b>Z10</b>

### Pressure differential

04	Max. admissible pressure differential of the filter element 5 bar [73 psi]	<b>S00</b>
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### Bypass valve

05	<b>Without</b> bypass valve	<b>0</b>
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### Seal

06	NBR seal	<b>M</b>
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### Order example:

**46.10 Z02-S00-0-M**

**Material no.: R928025386**

Material no.	Description
<b>R928025386</b>	46.10 Z02-S00-0-M
<b>R928025387</b>	46.10 Z10-S00-0-M

## Function, section

Rexroth CELLUDISC depth filter elements are used for the microfiltration of fluids in which a very high oil cleanliness is required.

Typical applications are filling filtration, supportive filtration in the bypass and when flushing hydraulic and lubrication oil systems.

The main filter variables, such as retention rate, dirt holding capacity and pressure loss are determined by the filter elements and the filter media used to construct them.

Due to the high retention rate, main flow filters are supported by a supplementary filtration in the bypass (multi-pass).

A high retention rate is already achieved in a single pass, such as a filling application, for example.

The filter element consists of 16 individual cells in the form of a disc, in which each cell consists of two ultrasonic-welded discs. Spacers on the edges of the respective discs prevent contact between the cells and guarantee optimal filtration.

The filter material is composed of compressed and impregnated cellulose fibers, which are provided with filter auxiliary materials to support the filtration process.

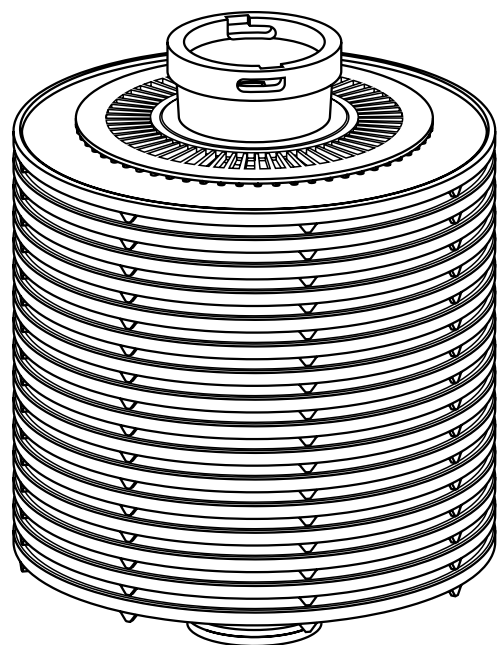
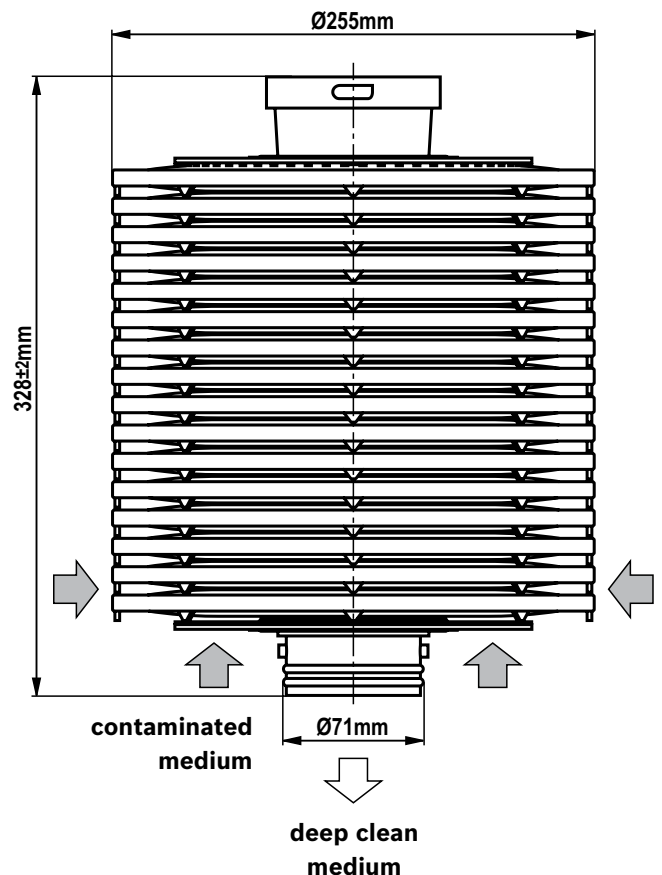
The filtration takes place from the outside inwards.

The sealing of the filter element relative to the filter housing is done by means of two seal rings.

### Zinc-free filter element set-up

All filter elements of the Rexroth preferred program are made of zinc-free components thus preventing the formation of zinc-soap, in particular if water-containing fluids (HFA/HFC) and synthetic oils are used. Moreover, many manufacturers of construction and agricultural machinery stipulate the use of zinc-free machine elements for rapidly bio-degradable hydraulic oils.

With regard to the aforementioned fluids, the use of zinc-free filter elements prevents early "blocking" of the filter element, thus considerably increasing the lifetime of the filter elements. Therefore, Rexroth filter elements can be used universally for hydraulic fluids and lubricants.



## Filter variables

### Filter rating and attainable oil cleanliness

The main goal when using industrial filters is not only the direct protection of machine components but to attain the required oil cleanliness.

Oil cleanliness is defined on the basis of oil cleanliness

classes which classify how the amount of particles of the existing contamination is distributed in the operating liquid.

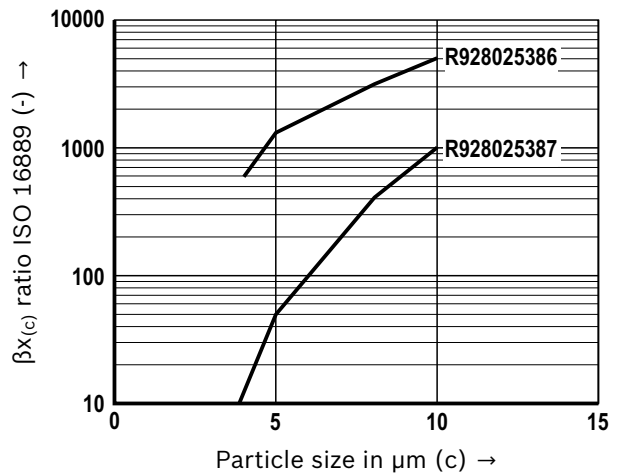
### Filtration performance

#### Filtration quotient $\beta_{x(c)}$ ( $\beta$ value)

The retention capacity of a hydraulic filter with respect to the contamination in a hydraulic system is characterized by the filtration quotient  $\beta_{x(c)}$ . This variable is the most important performance characteristic of a hydraulic filter. It is measured in the multipass test, and is the average value of the specified initial and final pressure differential according to ISO 16889 using ISOMTD test dust.

The filtration quotient  $\beta_{x(c)}$  is defined as the quotient of the particle count of the respective particle size on both sides of the filter.

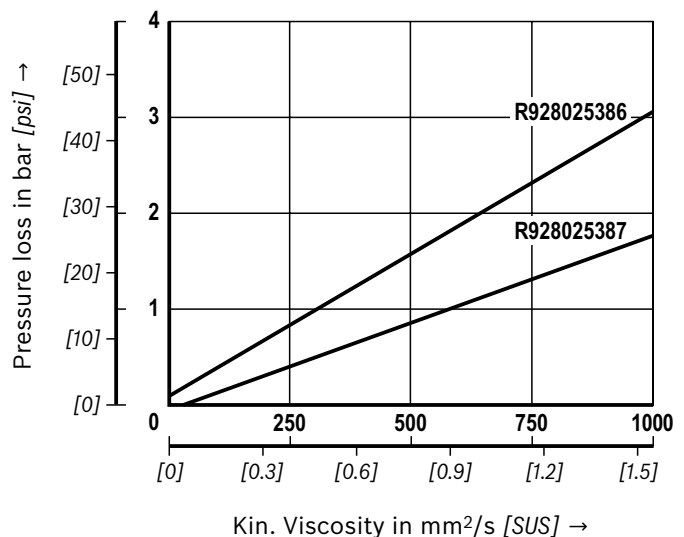
#### Filtration ratio / particle size – ISO 16889



#### Dirt holding capacity

It is also measured using the multipass test and determines the amount of test dust ISOMTD which is fed to the filter medium until a specified pressure differential increase has been reached.

#### Pressure loss / kin. Viscosity for 15 l/min – ISO 3968



#### Pressure loss (also pressure differential or delta p)

The pressure loss of the filter element is the relevant characteristic value for the determination of the filter size. Here it concerns the filter manufacturer's recommendations or the filter user's specifications. This characteristic value depends on many factors. Mainly: the rating of the filter media, its geometry and arrangement in the filter element, the filter area, the operating viscosity of the fluid and the flow.

The term "delta p" is also denoted by the symbol: " $\Delta p$ ". When dimensioning the filter, an initial pressure loss is determined which must not be exceeded by the new filter element based on the aforementioned conditions.

The diagram below shows the pressure loss behavior.

**Technical data preferred program**

(for applications outside these parameters, please consult us!)

<b>General</b>		
Weight	Size	<b>46.10</b>
	kg [lbs]	3.56 [7.84]
Filtration direction		From the outside to the inside
Ambient temperature range	°C [°F]	-30 ... +100 [-22 ... +212]
Number of filter cells		16
Diameter	mm [in]	254 [10]
Filter area	m <sup>2</sup> [in <sup>2</sup> ]	1.4 [2.17]
Seal material		NBR
<b>Hydraulic</b>		
Hydraulic fluid temperature range	°C [°F]	-10 ... +100 [+14 ... +212]
Minimum conductivity of the medium	pS/m	300

## Filter media

### Technical data

#### Cellulose fibers, Z...

With the proper size selection and application, the filter medium achieves a high degree of cleanliness for hydraulic fluids and lubricants. Due to its defined retention capacity (ISO 16889), it offers highly effective protection for machine and system components which are sensitive to contamination.

- ▶ The filter material is composed of compressed and impregnated cellulose fibers, which are provided with filter auxiliary materials to support the filtration process.

- ▶ Absolute filtration/defined retention capacity according to ISO 16889
- ▶ High dirt holding capacity due to pronounced depth filtration, with material density increasing with depth
- ▶ Non-reusable filter (not cleanable due to the depth filtration effect)
- ▶ Attainable oil cleanliness classes according to ISO 4406 up to 12/9/7.

#### Filter rating and attainable oil cleanliness

The following table provides recommendations for the selection of a filter medium in dependency of the applica-

tion and indicates the average oil cleanliness class attainable according to ISO 4406.

Application	Recommended oil cleanliness according to ISO 4406	Recommended filter medium
Bypass filtration as depth filter in conjunction with extremely large dirt holding capacity. e.g.: Machine tools, plastic injection molding machines, test stands	12/9/7 ... 16/12/9	Z02
	15/13/9 ... 19/14/11	Z10

#### Filtration quotient $\beta_{x(c)}$

Typical  $\beta$  values of up to 2.2 bar [31.9 psi]  $\Delta p$  pressure increase at the filter element

Filter medium	Particle size "x" for different $\beta$ values, measurement according to ISO 16889	
	$\beta_{x(c)} \geq 200$	$\beta_{x(c)} \geq 1000$
Z02	< 4 $\mu\text{m(c)}$	4.7 $\mu\text{m (c)}$
Z10	< 4 $\mu\text{m(c)}$	10.0 $\mu\text{m (c)}$

## Compatibility with permitted hydraulic fluids

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils	HLP	NBR	DIN 51524
Bio-degradable ▶ Insoluble in water	HETG	NBR	ISO 15380



### Important Information on hydraulic fluids:

- ▶ For more information and data on the use of other hydraulic fluids, please refer to data sheet 90220 or contact us.
- ▶ There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.)!

- ▶ The flash point of the hydraulic fluid used must be 40 K higher than the maximum solenoid surface temperature.
- ▶ **Bio-degradable:** When using bio-degradable hydraulic fluids that are also zinc-solvent, zinc may accumulate in the fluid (700 mg zinc per pole tube).

## Installation, commissioning and maintenance

### When has the filter element to be replaced or cleaned?

As soon as the dynamic pressure or the pressure differential set at the maintenance indicator is reached, the red push button of the optical-mechanical maintenance indicator pops out. Existing electronic maintenance indicators also give an electrical signal. In this case, the filter element must be replaced or cleaned.

Filter elements should be replaced or cleaned after max. 6 months.



### Note:

If the maintenance indicator signal is ignored, the increasing pressure differential may damage the filter element causing it to collapse

### Filter element exchange

- ▶ For single filters:  
Switch off the system and discharge the filter on the pressure side.
- ▶ For installed duplex switch filters:  
refer to the relevant maintenance instructions according to the data sheet.

### WARNING!

- ▶ Filters are containers under pressure. Before opening the filter housing, check whether the system pressure in the filter has been decreased to ambient pressure. Only then may the filter housing be opened for maintenance.
- ▶ Detailed instructions with regard to the exchange of filter elements can be found on the data sheet of the relevant filter series.
- ▶ Functional and safety warranty only applicable when using genuine Bosch Rexroth spare parts!
- ▶ Warranty becomes void if the delivered item is changed by the ordering party or third parties or improperly mounted, installed, maintained, repaired, used or exposed to environmental condition that do not comply with the installation conditions.

## Directives and standardization

Rexroth filter elements are tested and quality-monitored according to different ISO test standards:

Filter performance test (multipass test)	ISO 16889:2008-06
$\Delta p$ (pressure loss) characteristic curves	ISO 3968:2001-12
Compatibility with hydraulic fluid	ISO 2943:1998-11
collapse pressure test	ISO 2941:2009-04

The development, manufacture and assembly of Rexroth industrial filters and Rexroth filter elements is carried out within the framework of a certified quality management system in accordance with ISO 9001:2000.

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