HYDAC INTERNATIONAL

Innovative Element Technology

for installation in HYDAC filters

- Quick Selection -

High Quality Element Technology for Hydraulic Oils and Lubricants

Design

As the core of the filter, it is the filter element which performs the actual filtration and/or dewatering function in the housing. Elements consist of several pleated filtration and support layers which are placed as a cylinder around or inside the stabilizing support tube. These mesh packs are sealed by the end-caps. Depending on the type of filter, flow direction through the filter elements is from the outside to the inside, or from the inside to the outside. Depending on the filter material, the filter mesh pack is encased in an additional outer plastic wrap.

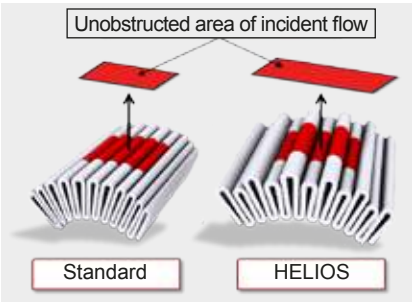
Innovation
Stat-Free® technology

With the new Stat-Free® filter elements, HYDAC has for the first time succeeded in combining excellent electrostatic characteristics with filtration performance. Unprecedented low charge generation in the filter element and in the fluid in the system is achieved with a new type of filter element mat and element design.

Innovation
HELIOS pleat geometry

Helios doubles the available area for incident flow and its small support pleats prevent collapsing of the filter mesh pack (compression of the pleats) even under high hydraulic loads.

In comparison to a standard pleat design, Helios achieves a significant reduction in flow velocity between the pleats and this is maintained even under the most adverse conditions.



Innovation
Outer wrap printed with customer logo

Since the outer wrap can be printed with the customer logo, it acts as an advertising medium for the OEM and guarantees security of the spares business. At the same time, the user can be certain of obtaining an original spare part. Particular benefit: the logo remains perfectly legible even in the contaminated condition.

The outer wrap with its multicoloured design and improved diffuser effect ensures optimised flow over the pleat tips.

The tried-and-tested outer wrap which is in highly tear-resistant plastic has elliptical perforations in the Optimicron® element. The shape of these pores (patent pending) improves the angle of incidence onto the filter pleats.

Installation and element versions

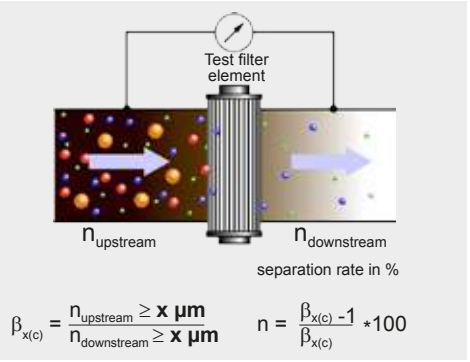
- In inline filters to API 614 (element version "**A**")
- In return line filters/inline filters (element version "**R**")
- In return line filters to DIN 24550 (element version "**RN**")
- In inline filters (element version "**D**")
- In inline filters to DIN 24550 (element version "**DN**")
- In inline filters, but return line filter element (element version "**RD**")
- In inline filters MFX (element version "**MX**")
- In return line suction filters RKM (element version "**RK**")
- In suction line filters (element version "**RS**")

Multipass-Filter Efficiency Data to ISO 16889

The contamination retention and particle filtration performance of an element (with the exception of: paper P, P/HC, wire mesh W, W/HC, V and Superabsorber AM) are established in the multipass test to ISO 16889. This procedure with its precisely defined test conditions and a standard test dust (ISO MTD) enables the performance data of different elements to be compared.

Explanation of the Multipass Test

The multipass test is an idealised hydraulic circuit, in which the filter element under test is subjected to a constant flow rate. The size and number of contamination particles are calculated before and after the element.
The ratio of the number of particles of a certain size (and larger) before the filter to the number of particles of a certain size after the filter indicates the filtration performance, what is known as the $\beta_{x(c)}$ value. The "x" stands for the particular particle size being considered. A $\beta_{x(c)}$ value of 200 or above is considered (according to DIN 24550) to be absolute filtration. It is important that $\beta_{x(c)}$ values remain at absolute level over a wide differential pressure range and do not fall as the element contamination and operating time increase. The degree of separation is determined from the $\beta_{x(c)}$ value (see illustration).



$$\beta_{x(c)} = \frac{n_{upstream} \geq x\ \mu m}{n_{downstream} \geq x\ \mu m} \qquad n = \frac{\beta_{x(c)} - 1}{\beta_{x(c)}} * 100$$

Performance features

Owing to their high performance standard, HYDAC absolute elements protect the functions of important and expensive hydraulic components and increase their service life.
The most important performance features are:

- High level of particle separation ($\beta_{x(c)}$ values)
- High level of particle separation over a wide differential pressure range (high $\beta_{x(c)}$ value stability)
- High contamination retention capacity
- High burst pressure values
- Low initial pressure difference
- Good flow fatigue strength
- Good water retention capacity (for water-absorbent filter materials)

Dynamic Multipass Test = Hydraulic Load Cycle Test (HLCT)

The new dynamic Multipass Test provides application-orientated characteristics of filtration performance data (field measurements) and relates directly to real work cycles. It is based on different flow profiles for selected HYDAC key applications derived from years of field experience. The Hydraulic Load Cycle Test establishes a direct association of the particular flow profiles to the filter designs and filter media used.

Performance features

- **Flow ripple parameters adjusted to suit the user**
  - Flow rate acceleration
  - Retention times at Q_{min} and Q_{max}
  - Pulsation frequency
- **Test fluid selected according to**
  - oil type for specific application
  - Operating temperature
  - Operating viscosity
- **Test dirt and type of dirt addition selected on basis of following aspects**
  - Both test dirt alternatives (ISO MTD and ISO FTD)
  - Other test dirt varieties with greater practical relevance
  - Both options for dirt addition (discontinuous/continuous)
    Type of dirt addition adjusted to suit application
    (e.g. in relation to machine's operating conditions, discontinuous dirt addition for maintenance or oil change)
  - Adjusted upstream dirt concentration
- **Simple presentation of results**
  - β values and β value stability spread out across entire duration of test
  - Cleaning cycles only with specific reference to application
    Example: filter element 0160 D… e. g. cleaning cycles for different operating conditions (cold start, commissioning system pump, for various load conditions of the filter element)
  - Direct reference to application-specific flow rate

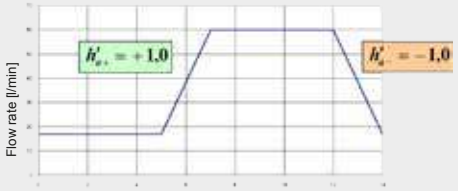
NEW and ESSENTIAL dynamic parameters:

Flow rate acceleration number (VB number) (for each cm² filter area)

$$h'_{a(+/-)} = \frac{\left(\frac{dQ}{dt}\right)}{A_{eff}} = \frac{\left(\frac{Q_2 - Q_1}{t_2 - t_1}\right)}{A_{eff}} = \frac{a_Q}{A_{eff}} \qquad \left[\frac{l}{min^2 \cdot cm^2}\right]$$

With:

dQ	Flow rate difference between Q_2 and Q_1	[l/min]
dt	Time difference between t_1 and t_2	[min]
A_{eff}	Effective filtration area	[cm²]



Example: Filter element 0160 D...

A large choice of filter elements.

Optimicron® Power

- **Designation:** ON/PO
- **Filter material:** plastic fibre, multi-layer support
- **Filtration rating:** 5, 10, 20 µm
- **Collapse stability:** 10 bar
- **Flow direction:** outside to inside.
- **Plastic shell:** yes
- **Element version:** A, R
- **Element type:** single-use element
- **Brochure no.:** 7.213../..

Optimicron® Pulse

- **Designation:** ON/PS, OH/PS
- **Filter material:** glass fibre, single-layer support
- **Filtration rating:** 3, 5, 10, 20 µm
- **Collapse stability:** 20 / 210 bar
- **Flow direction:** outside to inside.
- **Plastic shell:** yes
- **Element version:** D
- **Element type:** single-use element
- **Brochure no.:** 7.222../..

Optimicron® Pulp & Paper

- **Designation:** ON/PP
- **Filter material:** glass fibre, multi-layer support
- **Filtration rating:** 5 µm
- **Collapse stability:** 10 bar
- **Flow direction:** outside to inside.
- **Plastic shell:** yes
- **Element version:** R
- **Element type:** single-use element
- **Brochure no.:** 7.223../..

	AFLD	AFLS	DF	DF... M P	DF...M A DF... MHA	DF...Q E DF...MHE	DFDK	DFDKN	DFF	DFFX	DFM	DFN	DFNF
Optimicron® Power	A	A											
Optimicron® Pulse			D		D	D			D	D			
Optimicron® Pulp & Paper													
Optimicron®			D	D	D	D	D		D	D	D		
Betamicron®			D	D	D	D	D	DN	D	D	D	DN	DN
Mobilemicron®													
Ecomicron®													
Stainless steel wire mesh			D	D	D	D	D	DN	D	D		DN	DN
Paper													
Metal fibre			D	D	D	D	D		D	D			
Aquamicron®													
Aquamicron®/ Betamicron®													

The right filter element for every application.

Optimicron®

Caution: Ongoing conversion from Betamicron® (BN4HC) to Optimicron® (ON)!

- **Designation:** ON
- **Filter material:** glass fibre, multi-layer support
- **Filtration rating:** 1, 3, 5, 10, 15, 20 µm
- **Collapse stability:** 20 bar
- **Flow direction:** outside to inside.
- **Plastic shell:** yes
- **Element version:** D, R
- **Element type:** single-use element
- **Brochure no.:** 7.224../..

Betamicron®

- **Designation:** BN4HC, BH4HC
- **Filter material:** glass fibre, multi-layer support
- **Filtration rating:** 3, 5, 6, 10, 20, 25 µm
- **Collapse stability:** 20 / 210 bar
- **Flow direction:** outside to inside.
- **Plastic shell:** yes
- **Element version:** D, DN, MX, R, RD, RN
- **Element type:** single-use element
- **Brochure no.:** 7.210../..

Mobilemicron®

- **Designation:** MM
- **Filter material:** plastic fibre, multi-layer support
- **Filtration rating:** 8, 10, 15 µm
- **Collapse stability:** 10 bar
- **Flow direction:** outside to inside.
- **Plastic shell:** yes
- **Element version:** MX, R, RD, RK
- **Element type:** single-use element
- **Brochure no.:** 7.211../..

	DFP	DFPF	DFZ	FLN	FLND	FMMD	HDF	HDFF	HFM	LF	LFF	LFM	LFN
Optimicron® Power													
Optimicron® Pulse			D										
Optimicron® Pulp & Paper													
Optimicron®	D	D	D		D	D	D	D	D	D	D	D	
Betamicron®	D	D	D	DN	D / DN	D / DN	D	D	D	D	D	D	DN
Mobilemicron®													
Ecomicron®													
Stainless steel wire mesh				DN	D / DN	D / DN				D	D		DN
Paper													
Metal fibre	D	D	D							D	D		
Aquamicron®													
Aquamicron®/ Betamicron®													

Better Quality, Performance and Efficiency.

Ecomicron®

- **Designation:** ECON2
- **Filter material:** glass fibre, multi-layer support
- **Filtration rating:** 3, 5, 10, 20 µm
- **Collapse stability:** 10 bar
- **Flow direction:** outside to inside.
- **Plastic shell:** yes
- **Element version:** MX, R
- **Element type:** single-use element
- **Brochure no.:** 7.212../..

Stainless steel wire mesh

- **Designation:** W, W/HC
- **Filter material:** **stainless steel wire mesh**
- **Filtration rating:** 25, 50, 100, 200 µm
- **Collapse stability:** 20 bar
- **Flow direction**: outside to inside (D, DN, R, RN)
  inside to outside (RS)
- **Plastic shell:** no
- **Element version:** D, DN, R, RN, RS
- **Element type:** cleanable to some extent
- **Brochure no.:** 7.215../..

Stainless steel fibre

- **Designation:** V
- **Filter material:** metal fibre
- **Filtration rating:** 3, 5, 10, 20 µm
- **Collapse stability:** **210 bar**
- **Flow direction:** outside to inside.
- **Plastic shell:** no
- **Element version:** D, R
- **Element type:** cleanable to some extent
- **Brochure no.:** 7.216../..

	LFNF	LPF	LPF...GGA	LPF.../-TH	MDF	MFM	MFM...L	MFM.../-OIU	MFX	NF	NFD	RF
Optimicron® Power												
Optimicron® Pulse												
Optimicron® Pulp & Paper										R	R	
Optimicron®		D			D	D	D	D		R	R	R
Betamicron®	DN	D	RD	RD	D	D	D	D	MX	R	R	R
Mobilemicron®			RD	RD					MX			
Ecomicron®									MX	R	R	
Stainless steel wire mesh	DN	D			D					R	R	R
Paper										R	R	R
Metal fibre					D					R	R	R
Aquamicron®										R	R	
Aquamicron®/ Betamicron®										R	R	R

Innovation in every pleat.

Paper

- **Designation:** P, P/HC
- **Filter material:** cellulose fibre
- **Filtration rating:** 10, 20 µm
- **Collapse stability:** 10 bar
- **Flow direction**: outside to inside (R)
  inside to outside (RS)
- **Plastic shell:** no
- **Element version:** R, RS
- **Element type:** single-use element
- **Brochure no.:** 7.214../..

Aquamicron®

- **Designation:** AM
- **Filter material:** superabsorber
- **Filtration rating:** 40 µm
- **Collapse stability:** 10 bar
- **Flow direction:** outside to inside.
- **Plastic shell:** no
- **Element version:** R
- **Element type:** single-use element
- **Brochure no.:** 7.217../..

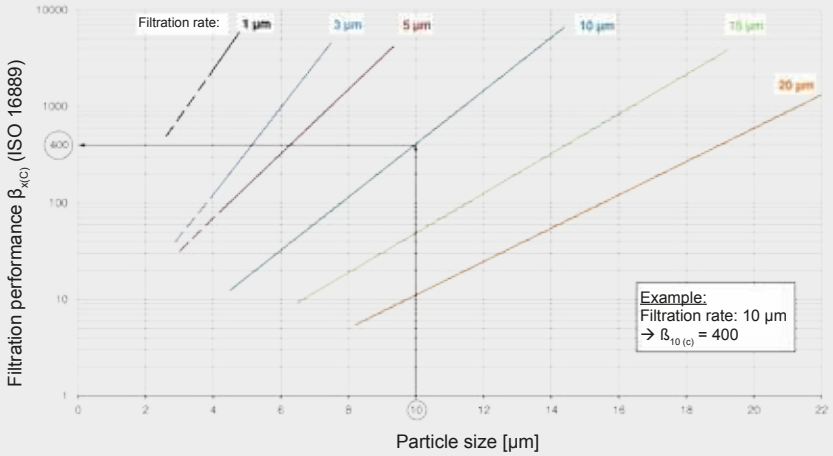
Betamicron® / Aquamicron®

- **Designation:** BN4AM
- **Filter material:** glass fibre with superabsorber
- **Filtration rating:** 3, 10 µm
- **Collapse stability:** 10 bar
- **Flow direction:** outside to inside.
- **Plastic shell:** no
- **Element version:** R
- **Element type:** single-use element
- **Brochure no.:** 7.218../..

	RFD	RFL Cast/weld	RFLD Cast/weld	RFLN	RFLND	RFM	RFN	RFND	RKM	SF	SFF	SFM
Optimicron® Power		R	R									
Optimicron® Pulse												
Optimicron® Pulp & Paper												
Optimicron®	R	R	R			R						
Betamicron®	R	R	R	RN	RN	R	RN	RN				
Mobilemicron®						R			RK			
Ecomicron®						R						
Stainless steel wire mesh	R	R	R			R				RS	RS	RS
Paper	R	R	R			R				RS	RS	RS
Metal fibre	R	R	R									
Aquamicron®	R	R	R			R						
Aquamicron®/ Betamicron®	R	R	R			R						

Filtration performance

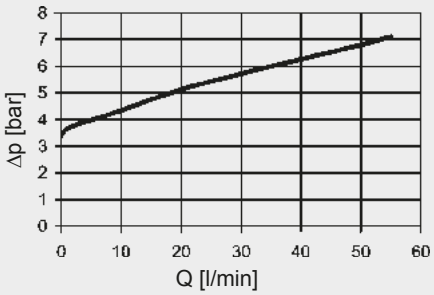
The illustration shows the filtration efficiencies for various filtration ratings, with Optimicron® used as an example:



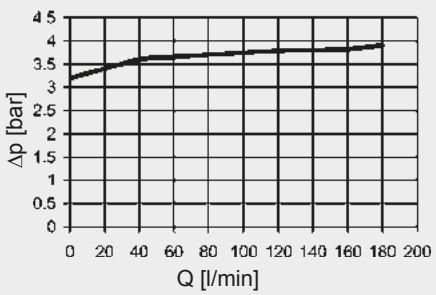
Bypass valve curves

The bypass valve curves apply to mineral oil with a density of 0.86 kg/dm³.
The valve differential pressure changes proportionally to the density (others on request). (others on request)

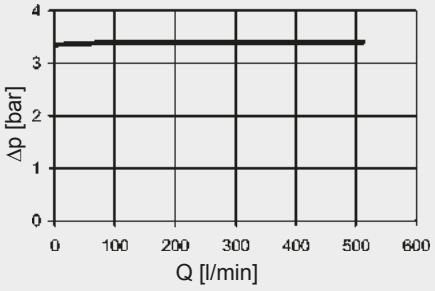
30



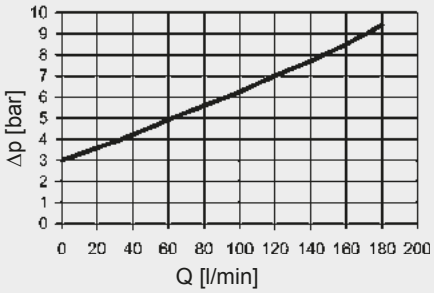
75, 160, 165, 185, 240, 280



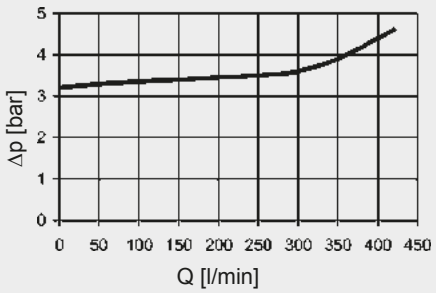
660, 850, 1700



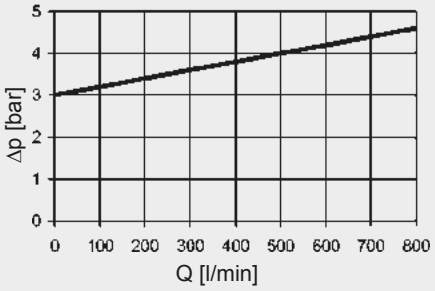
60, 90, 110, 140, 150



210, 270, 330, 500, 750



950, 1300, 2600



NOTICE
The information in this brochure relates to the operating conditions and applications described.
For applications or operating conditions not described, please contact the relevant technical department. For applications or operating conditions not described please contact the relevant technical department.
All technical details are subject to change without notice.

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HYDAC FILTERTECHNIK

Innovative Element Technology

Stat-Free®

1. Introduction

The use of modern environmentally-friendly hydraulic and lubrication oils, together with the trend towards ever more compact systems and finer filtration, has in the past few years exacerbated the problem of electrostatic charge and discharge. As a result, the components integrated into the system become severely restricted in their function or are even damaged. Electrostatic discharges destroy filter elements, damage valves and sensors and can even cause explosions in the hydraulic tank. In addition, they accelerate oil ageing.

To ensure that the whole system operates economically and without risk, it is essential to use filter systems which are capable of absorbing oil ageing products and which can prevent dangerous electrostatic discharges from occurring. Unscheduled and costly oil changes can be avoided by using this system of filters.

We have recognized the long-term problem of electrostatic discharge and with our innovative **Stat-Free® series of elements** have developed an effective solution to the occurrence of charging and discharging in the hydraulic and lube circuit.

With findings drawn from the specifically designed **Electrostatic Test Rig** which has been verified by TÜV as well as numerous field tests, we have been able to create an element technology which inhibits the phenomenon of electrostatic discharge in the filter element as well as significantly reducing the charge in the oil.

In the following pages, the principles and consequences of electrostatic charge and discharge in the hydraulic circuit are examined more closely and the advantages of the new Stat-Free® element technology are demonstrated.

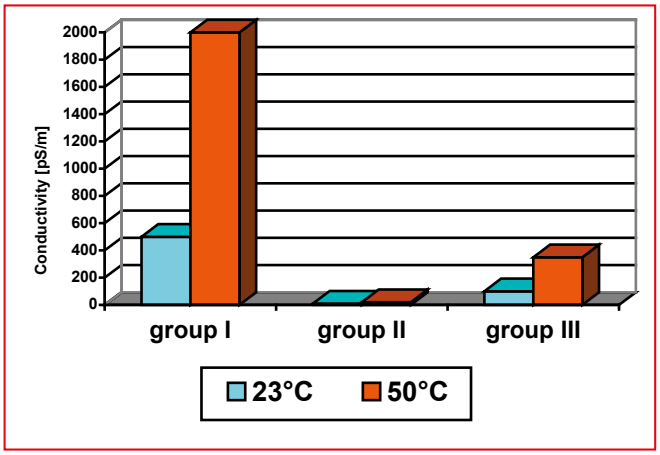
2. The Trend in Hydraulic Fluids

Globalisation of markets compels oil producers worldwide to supply consistently high quality hydraulic and lubrication oils to the manufacturers and operators of systems, such as compressor stations, large transmissions or machines. For category I base oils, where the molecular structure of the crude oil has not been changed, this is not guaranteed. Increasingly, therefore, base oils are used where the molecular structure has been broken down by hydrocracking and then selectively rearranged according to requirement.

Refinery capacities of oil producers all over the world are currently geared to this trend (in Asia and the USA, for example, predominantly category II base oils or higher are produced).

To achieve the oil characteristics guaranteed by the oil producers, additives (usually several, as an additive package) must be added to the base oil. Category I base oils contain aromatics most of which are toxic. In addition the additive packages contain zinc which is a heavy metal, and ash is produced on combustion. They therefore no longer comply with the current international environmental standards.

Hydraulic and lubrication oils in **category II and III** which are produced with appropriate additive packages, contain no toxins or carcinogens, are free of heavy metals and do not produce residues as a result of combustion. However, because they do not contain any metal, these oils have **low electrical conductivity**. When this oil flows through the filters in the hydraulic system, an electrostatic charge is generated. This can result in sparking in the system, which can cause considerable damage to hydraulic components.

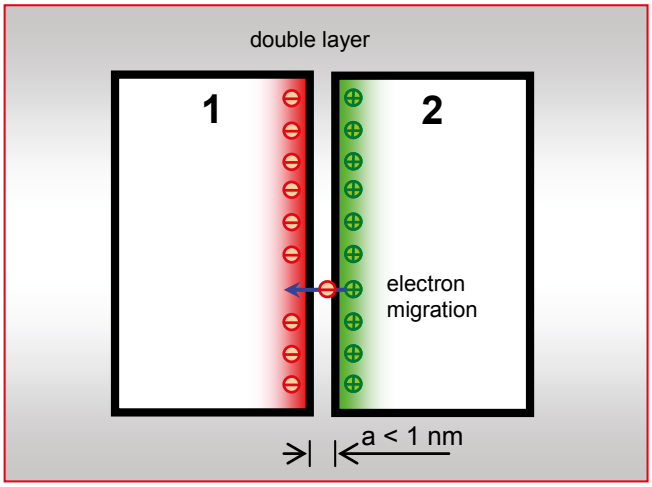


Examples of conductivity in oils of different categories

3. Theoretical Principles

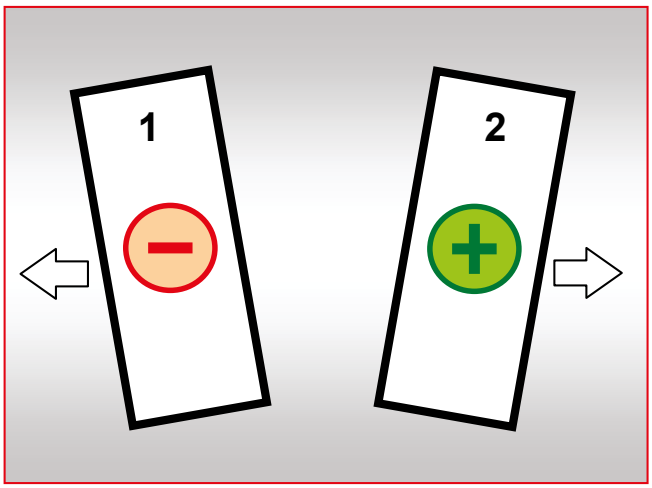
3.1 Electrostatic charging of solid particles

Every substance or material has a certain electron work function, i.e. the tendency to accept or release electrons. If two substances which have different electron work functions are then brought together (distance < 10^{-9}m) at the same temperature, then at the point of interface, electrons are transferred from the material with low work function to the material with higher work function. An electrical double layer is produced with a certain charge Q. There does not have to be any friction between the two materials. Friction merely reduces the distance between the substances involved.



Development of the double layer

If the two materials are separated and the distance between them is therefore increased, the capacitance is reduced and the potential difference (= voltage) is increased. Both materials are electrostatically charged.



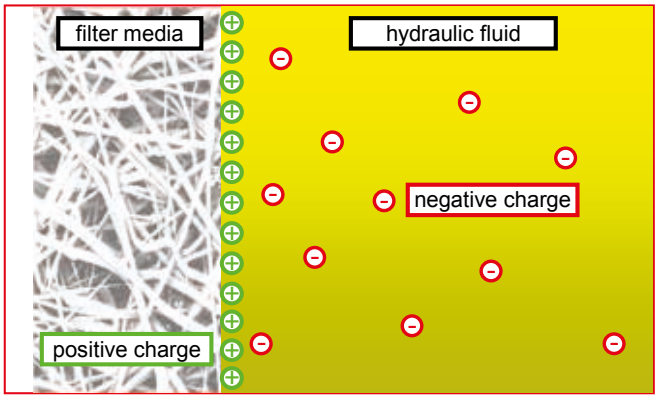
Separation of the two materials

The amount of charge is dependent on the speed of separation, amongst other things. If separated slowly, charge can be equalized over the last point of contact. The faster the separation occurs, the higher will be the charge.

If the voltage generated exceeds the specific limit of dielectric strength (in air approx. 3 kV/mm), there will be a sudden equalization of voltage which is usually in the form of discharge sparking.

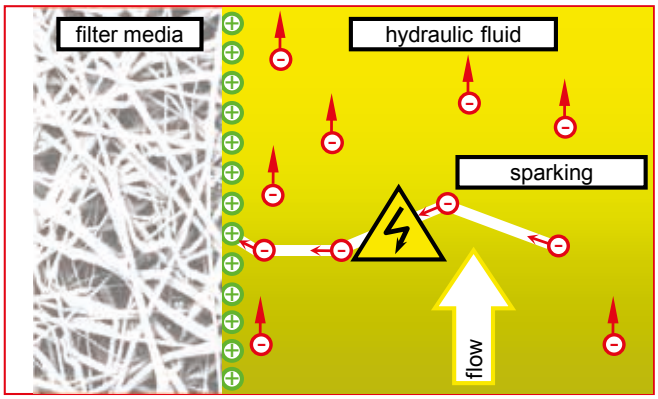
3.2 Charging of fluids

In fluid/solid systems as is the case in hydraulic systems (filter medium/oil) a double charging layer is also formed here at the phase boundary, as shown in the following diagram. Near the boundary, this double layer consists of a linked layer of charge carriers (in this case positively charged). In the oil there is a diffuse layer of opposing (negative) charge carriers.



Distribution of charge in fluid/solid systems

When the fluid then flows, the charge is carried downstream and creates a difference in potential. The faster the fluid is flowing, the higher the potential difference will be. If the voltage exceeds the dielectric strength of the oil, it will discharge in the form of sparking.



Sparking

The precondition for charge generation is that the fluid has a sufficiently low conductivity, otherwise the charges of the diffuse layer can flow back and can be equalized.

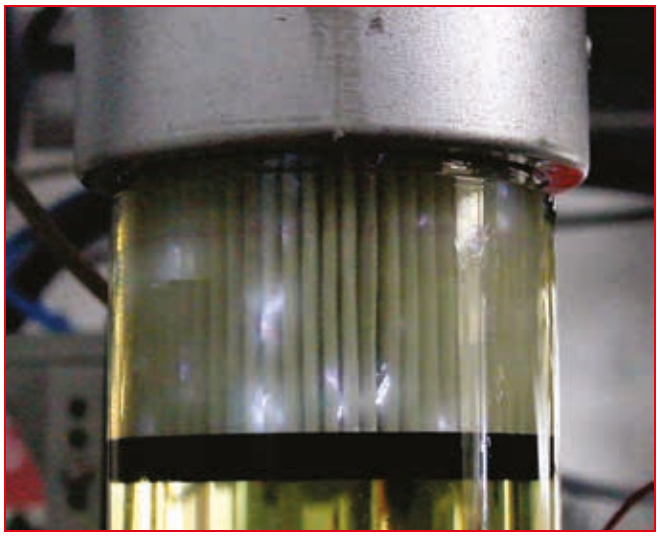
3.3 Main factors

The main factors influencing the electrostatic behaviour in hydraulic systems:

- **Electric conductivity**
  The lower the conductivity, the higher the charge
- **Filter medium**
  Different materials produce different charges depending on the electron work function
- **Temperature**
  In general the charge falls as the temperature rises
- **Flow velocity**
  The higher the flow velocity, the higher the charge
- **Contamination**
  Conductive particles or water increase the conductivity of the fluid which results in a lower charge

4. Consequences of Discharge

The consequences of electrostatic discharges can be serious.



Electrostatic discharging in the filter element

The discharge sparks can burn **holes**, for example, in the filter medium. The following picture shows a hole of about 200 µm in 3 µm filter media. The required oil cleanliness is therefore no longer achievable.

Burn hole in the filter material

Furthermore, when the charge is carried further downstream by the oil, uncontrolled discharges can occur in the hydraulic tank. Depending on the oil/air mixture in the tank, dangerous **explosions** are possible.

Breather filter burned as a result of explosion in the tank

The electrostatic discharges also cause **electromagnetic waves** which disrupt and damage sensitive sensors and electronic components in a hydraulic system.

It is not only hydraulic components but also the hydraulic oil itself which is damaged by discharges. The sparking cracks the molecules of the fluid and free radicals are formed. These radicals polymerize into long chains and this in turn leads to the **formation of varnish**. In addition, the free radicals accelerate oil ageing.

5. Measuring Equipment

5.1 Mobile measuring equipment

In order to examine more closely the electrostatic behaviour of a hydraulic system in the field, we have a range of test equipment.

With the aid of a **portable conductivity measurement instrument** we are able very quickly and simply to determine the electrical conductivity of the hydraulic fluid. It enables us to make an initial assessment as to whether the conductivity has fallen below a critical limit and can lead to electrostatic phenomena.

Furthermore, HYDAC has developed a special voltage sensor, the so-called **StatStick**. In conjunction with our widely-available portable device (HMG 3000) it is possible for our engineers in the field to measure the voltage in the oil directly in the system.

Innovative StatStick with HMG 3000

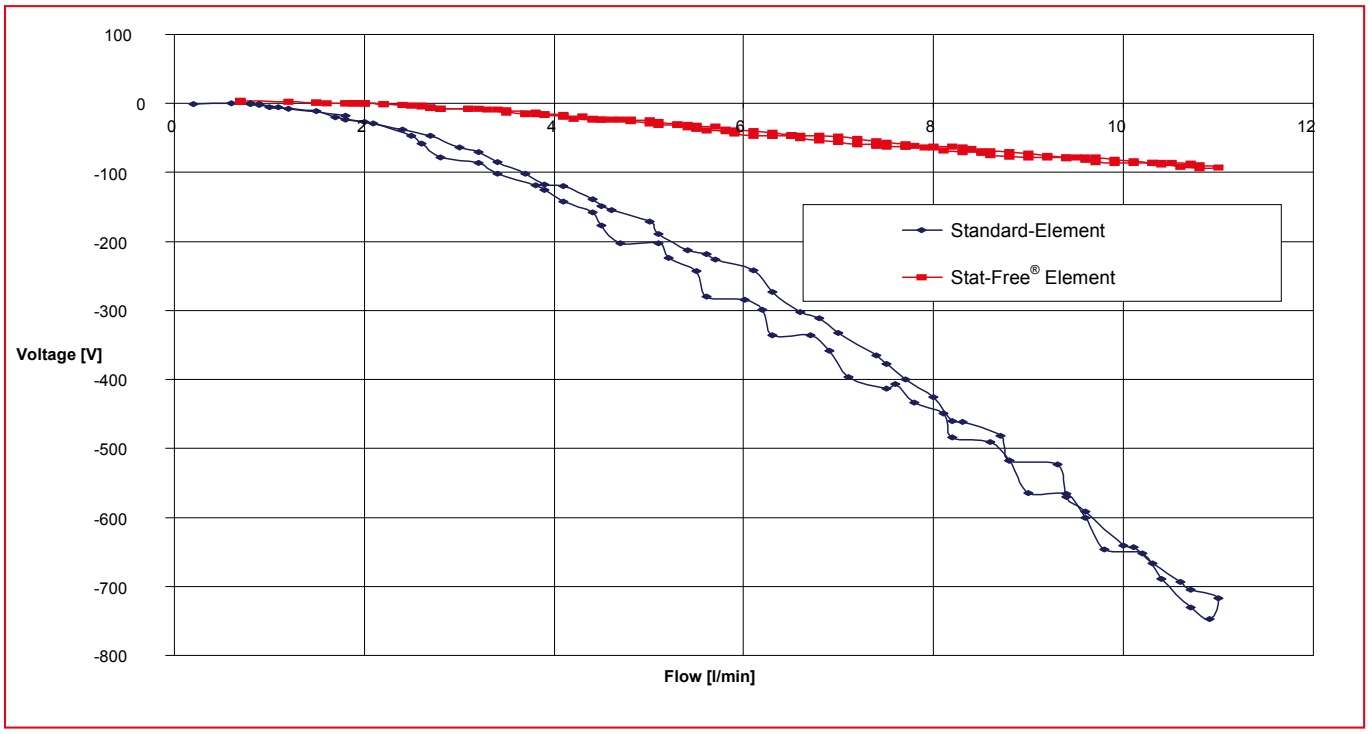
In the case of discharge sparking in the system, an oscilloscope can also be used as a measurement device. Owing to the high sampling rate of the oscilloscope, the transient discharges are shown as peaks on the display.

5.2 Stationary test rig

Our specially developed **test rig** which has been certified by TÜV is used to simulate real-world critical applications. With the help of the test rig, the electrostatic behaviour of the hydraulic filter in critical oils has been thoroughly analysed.

This has led to the development of the Stat-Free® filter element series which combats the problem of electrostatic discharge.

HYDAC Electrostatic Test Rig



Comparative measurement of a standard element versus a Stat-Free® element on the electrostatic test rig

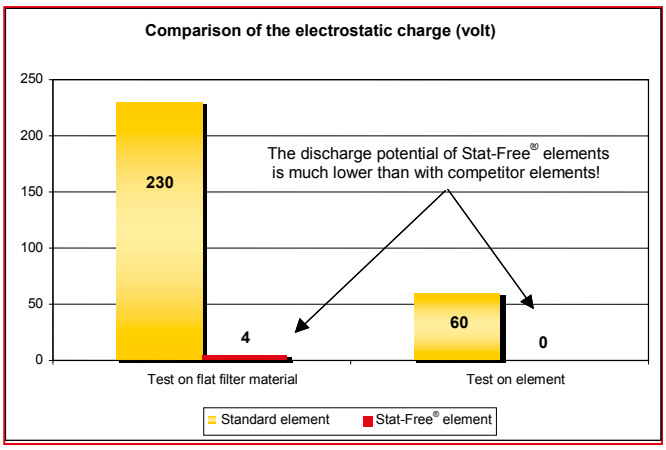
6. The Stat-Free® Technology

If a hydraulic system is using an oil with a **low conductivity** and a non-conductive filter element, the filter and the fluid can be **charged** electrostatically and can lead to electrostatic **discharges**.

A **purely discharge-capable** design without the addition of a special combination of media, indeed reduces sparking in the element but the oil continues to be charged. The charges at the interface of the filter can dissipate, but the fluid has an even **higher charge** because there is no sparking on the filter to neutralize the charge. The highly charged oil is transported further through the system and uncontrolled discharges are possible in other parts of the system which under certain circumstances can lead to serious damage (e.g. explosion in the tank).

Using a new type of filtration meshpack and element design, HYDAC has for the first time combined excellent electrostatic characteristics and filtratioin performance. Our Stat-Free® elements have achieved a previously **all-time low charge** of the filter element and the fluid during system operation. In addition the Stat-Free® elements are equipped with conductive O-ring caps and conductive core tubes.

The performance of Stat-Free® elements has been confirmed in thorough laboratory and field tests. By comparing the test diagram below, the Stat-Free® elements have a striking advantage over the conventionally designed standard elements, in terms of the oil charge generated.



Comparison of the electrostatic charge (volt)

The new Stat-Free® technology is available for the following HYDAC element materials:

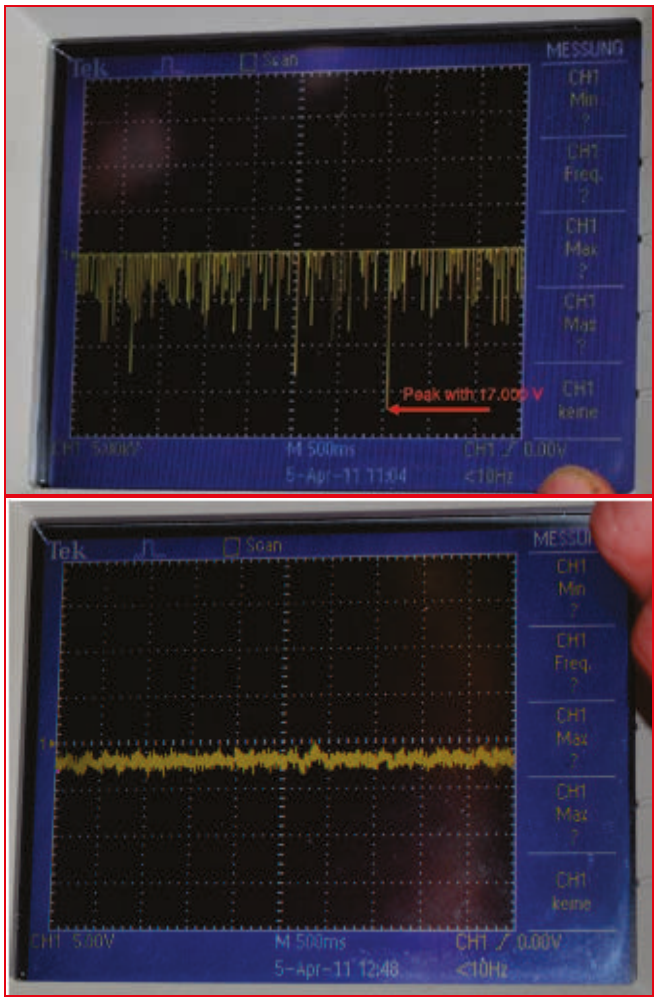
- **Mobilemicron (MM)**
  for filtration ratings 8, 10, 15 µm
- **Optimicron® (ON)**
  for filtration ratings 1, 3, 5, 10, 15, 20 µm,
  Optimicron® Pulp & Paper (ON/PP)
  for filtration rating 5 µm and
  Betamicron® (BN4HC, BH4HC)
  for filtration ratings 3, 5, 10, 20 µm
  In this case, please add **/-SFREE** to the element model code.
  Example: 2600 R 010 ON /-SFREE
- **Optimicron® Power (ON/PO)**
  for filtration ratings 5, 10, 20 µm and
  Optimicron® Pulse (ON/PS, OH/PS)
  for filtration ratings 3, 5, 10, 20 µm with SFREE inclusive

Stat-Free® elements are particularly suitable for applications in power plants, gas turbines, plastic injection moulding machines and calenders (paper industry) and in mobile hydraulics, as well as any other hydraulic and lubrication system which uses new low conductivity oils.

They guarantee a **high level of operating reliability**, since they prevent sparks, deflagration and sludge formation in the oil. **Longer oil change intervals** can be achieved through non-damaging filtration of the oil.

7. Real-World Example and Reference

HYDAC became aware of the possibility of explosions in the hydraulic tank of a large hydraulic system after breather filters were burned out. The filters concerned were competitor's filters which were not optimized for electrostatic charging. Measurements made on site using the StatStick revealed voltage peaks of **up to 17,000 Volt** and dangerous discharge sparks in the tank. Once retro-fitted with Stat-Free® elements, **no further discharges** could be detected and the voltage was just **2-3 Volt**.



Voltage measurement using StatStick (above: competitor's standard element voltage peaks up to 17kV [scaling: 5kV]; below: Hydac Stat-Free® element 2-3V [scaling: 5V])

A number of established companies in sectors such as turbine lubrication, presses, plastic injection moulding machines and mobile hydraulics have already named HYDAC as a reference with regard to finding a solution to the problem of electrostatic discharge, as indicated by the following quotation:

"Due to numerous, frequently recurring difficulties on actual systems, we urgently recommend using filter cartridges which inhibit electrostatic charging in oils with low electrical conductivity. ***These filters are available from HYDAC under the same model code, by adding "/-SFREE"."***

Moreover, the functionality of the Stat-Free® filter elements has been analysed by DEKRA EXAM GmbH, the German specialist unit for explosion protection at the mining test facility (BVS). The efficiency of the elements was confirmed in the expert report 13EXAM 10666 BVS-BI by DEKRA EXAM GmbH, Explosion Protection Department.

8. Summary

- The charge separation in **low conductivity oils** results in electrostatic charging and discharging.
- Electrostatic discharges can cause the following damage, amongst others:
  - Explosions in the hydraulic tank
  - Accelerated oil ageing
  - Damage to the filter element
  - Destruction of electronic components
  - Damage to cooler units
- A conductive design of filter element is **not** sufficient to reduce oil charging.
- HYDAC **Stat-Free® elements** ensure a very low charge in the filter element and the hydraulic fluid

Advantages:

- **High level of operating reliability**
  because discharge sparking, deflagration and sludge formation in the oil is eliminated
- **Longer oil change intervals**
  because filtration of the oil is non-damaging

Conclusion:

These developments prove that at HYDAC we will always find a solution to a customer problem. We not only provide an efficient result, but we will see you through the whole diagnostic process, especially in challenging cases.

We look forward to hearing about your new projects!

NOTES

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HYDAC INTERNATIONAL

Energy efficient filtration. Our contribution to sustainability.

Optimicron®
Innovative Filter Element Technology for Sustainable Filtration

HYDAC Optimicron® has a wealth of innovations and optimised features.

HYDAC Optimicron® at a glance:

- Unique HELIOS pleat geometry
- Innovative, integrated drainage layer*
- New, upstream drainage layer*
- Efficient filter materials
- Expansion of the range of filtration ratings
- Optimised filter element wrap

Optimicron® will save you up to 30 % in differential pressure. This not only protects your pocket, but also the environment.

*) Designed for specific applications

Optimicron®
Innovative Filter Element Technology for Sustainable Filtration

Resources are increasingly scarce, energy prices are rising and the environment is suffering. Energy efficiency is the key to counteracting this trend and to saving both costs and valuable resources.

HYDAC Optimicron® shows the way!

These innovative filter elements can make substantial savings on energy and costs for machine and system operators . The savings apply over the entire service life and the elements offer superior performance at the same time. The high energy efficiency of the new filter elements therefore reduces CO_2 emissions.

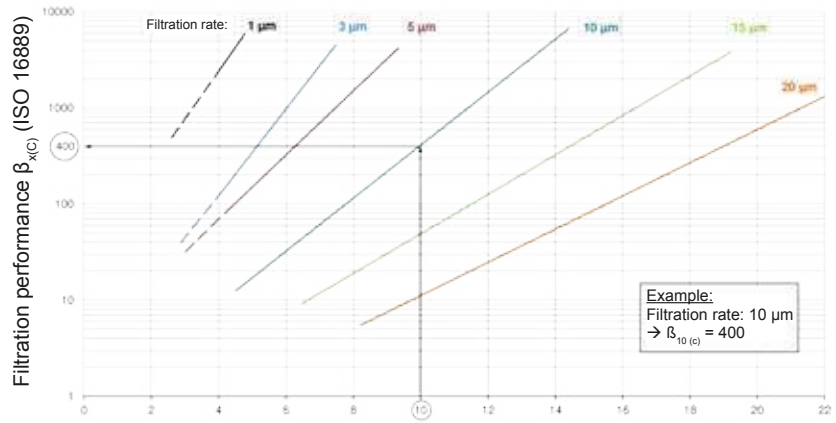
Our contribution to sustainability!

Optimicron® shows the way

Performance data

Energy and cost savings over the entire service life with superior performance at the same time.

β-values for Optimicron®



Δp/Q Gradient coefficients in mbar / l/min

Optimicron® D elements

Size	Filtration rating					
	1 µm	3 µm	5 µm	10 µm	15 µm	20 µm
0030	77.8	63.9	43.3	22.8	14.0	11.3
0035	50.2	21.3	17.1	13.7	10.0	7.44
0055	26.0	12.3	9.90	7.90	5.17	3.84
0060	53.5	26.0	18.3	12.1	9.78	6.32
0075	16.7	8.40	6.75	5.40	3.33	2.48
0095	13.2	6.74	5.40	4.33	2.62	1.92
0110	25.8	13.4	9.61	6.06	4.63	2.99
0140	19.9	11.5	7.39	4.38	3.54	2.29
0160	18.5	11.0	7.70	4.10	3.71	3.18
0240	11.5	6.90	5.34	3.19	2.44	2.10
0260	8.18	4.96	3.87	2.31	1.83	1.44
0280	5.54	3.37	2.74	1.49	1.36	1.17
0300	14.6	8.90	7.13	4.88	2.80	2.61
0330	8.23	4.19	3.37	2.46	1.55	1.22
0450	7.30	4.45	3.52	2.39	1.40	1.26
0500	5.05	2.57	2.07	1.23	0.949	0.747
0650	4.46	2.69	2.20	1.47	0.855	0.810
0660	3.78	1.93	1.56	0.93	0.710	0.562
0900	3.37	2.10	1.67	1.10	0.647	0.630
0990	2.51	1.280	1.031	0.613	0.472	0.372
1320	1.85	0.966	0.759	0.451	0.348	0.274
1500	1.64	0.968	0.704	0.480	0.360	0.284

Optimicron® R elements

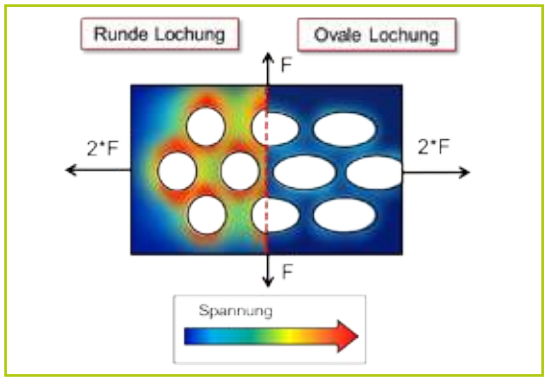
Size	Filtration rating					
	1 µm	3 µm	5 µm	10 µm	15 µm	20 µm
0030	89.8	68.4	43.9	26.8	16.8	14.7
0060	47.2	23.6	17.2	9.82	9.01	6.85
0075	25.6	19.4	13.4	7.31	4.80	4.40
0090	22.5	13.1	9.49	6.07	4.30	3.21
0110	22.3	13.1	8.87	5.40	4.26	3.24
0150	13.4	7.80	5.65	3.61	2.55	1.91
0160	16.0	8.00	5.68	3.22	2.69	2.32
0165	14.1	9.44	7.37	4.02	2.25	2.42
0185	10.4	7.44	5.74	2.93	1.65	1.41
0195	7.66	5.48	4.22	2.16	1.22	1.04
0210	5.66	3.28	2.55	1.53	1.00	0.88
0240	10.4	5.18	3.66	2.27	1.84	1.41
0270	3.66	2.12	1.65	0.993	0.649	0.568
0280	5.10	2.57	2.08	1.43	1.06	0.804
0330	8.09	3.72	2.73	1.48	1.28	1.02
0450	6.33	3.17	2.30	1.40	1.00	0.850
0500	5.27	2.60	1.90	1.09	0.835	0.685
0580	2.49	1.23	0.900	0.525	0.395	0.340
0600	2.35	1.23	1.10	0.613	0.416	0.340
0660	3.57	1.69	1.21	0.671	0.566	0.447
0750	2.11	1.12	0.924	0.529	0.335	0.322
0850	2.77	1.31	1.001	0.576	0.439	0.360
0950	2.39	1.03	0.793	0.476	0.379	0.311
1300	1.72	0.723	0.585	0.350	0.320	0.223
1700	1.35	0.640	0.527	0.281	0.252	0.176
2600	0.841	0.362	0.292	0.176	0.157	0.111

Optimicron® Features

Optimised filter element wrap

Innovative wrap offers a high degree of tear-resistance and identifies the element as being original equipment.

The new perforations ensure optimised flow onto the filter pleats and thus minimise pressure losses effectively.

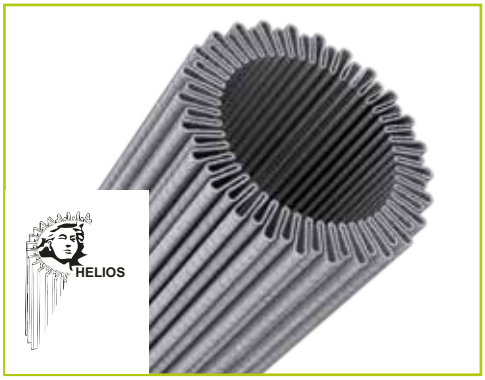


The optimised perforations have the effect of distributing the stress evenly in the axial and radial directions and thus increase tear-resistance.

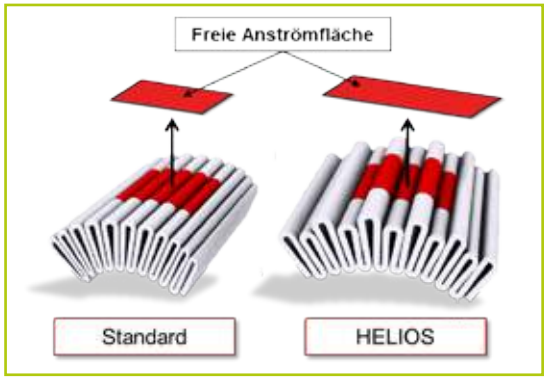
Customised multicoloured brand labelling provides protection from product piracy.

Innovative HELIOS pleat geometry

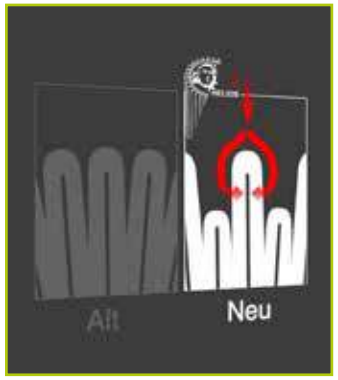
The special form of the pleats is like the crown of HELIOS, god of the sun.



The innovative HELIOS pleat geometry consists of alternating high and low pleats.



The special geometry significantly increases the area open to the flow and calms the flow in the area between the pleats, reducing the differential pressure.

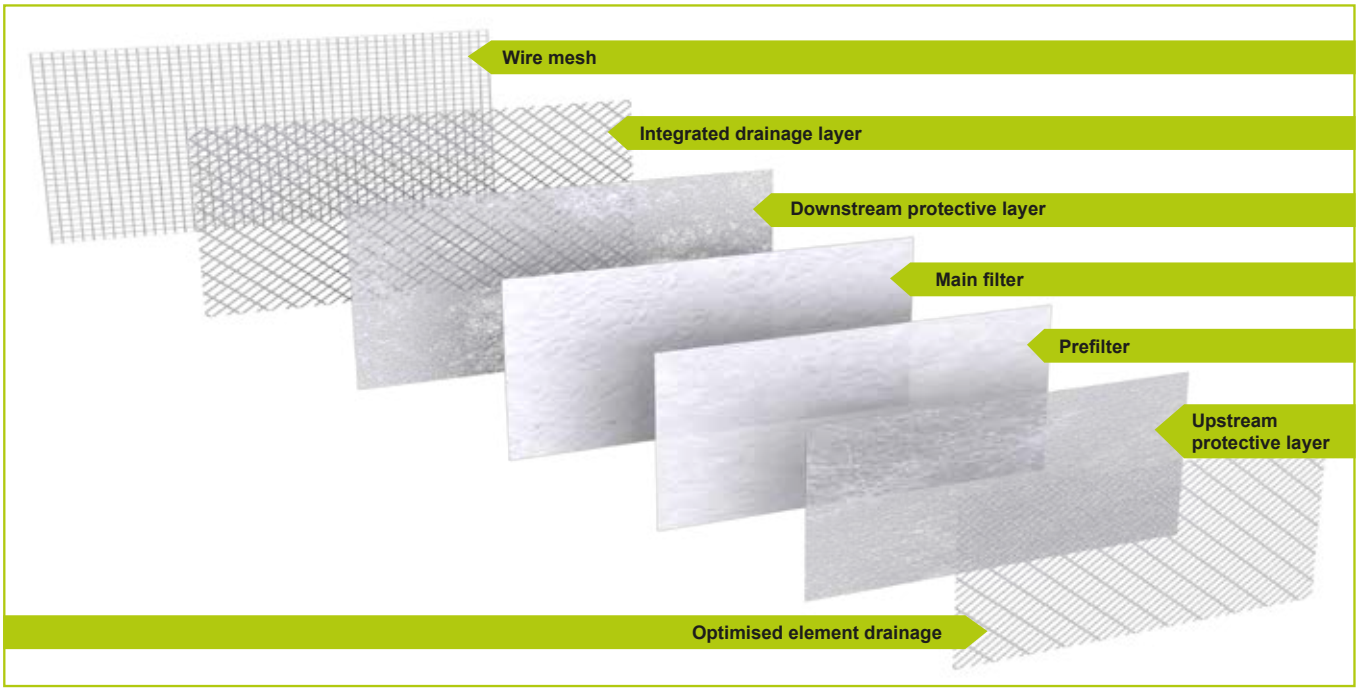


Particularly under high dynamic load conditions, the special geometry prevents the pleats becoming compressed and this reduces the differential pressure.

Optimicron® Features

Up to seven filtration layers

Free flow of fluid with very low differential pressure and high contamination retention.



Optimised element drainage
The unique asymmetrical structure provides large flow cross-sections, effectively preventing dead-spaces, turbulence and pressure losses

Upstream protective layer:
The homogenous and robust non-woven material protects the sensitive microglass media from mechanical damage.

Pre and main filter:
The graduated structure of the filter media ensures efficient particle retention together with a high level of contamination capacity and a long element service life.

Downstream protective layer:
The pressure-resistant protection and support layer offers optimum support for the pre- and main-filter media even under high differential pressure conditions.

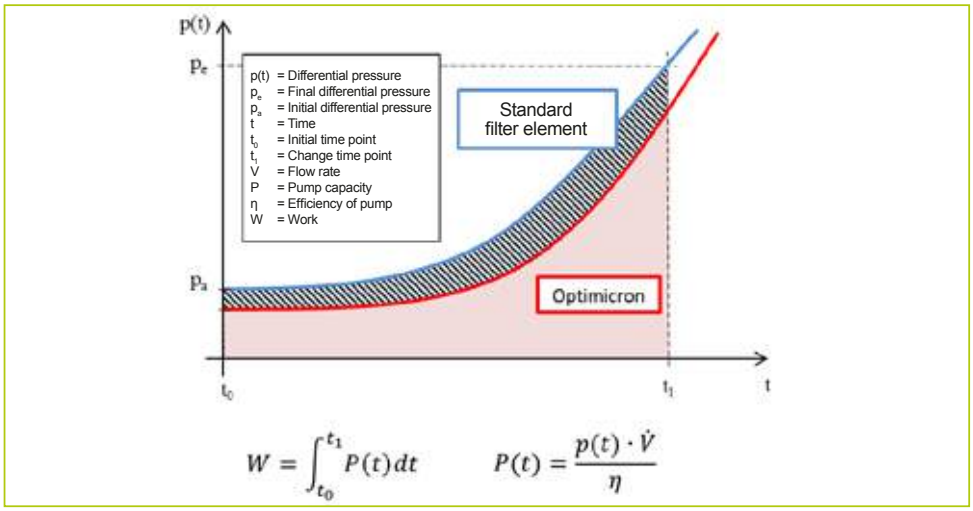
Integrated drainage layer
The integrated drainage layer directs the flow of fluid freely to the clean side and results in very low element differential pressures.

High quality wire mesh:
The stainless steel mesh ensures high stability of the filter pleats and has excellent fluid compatibility.

Optimicron® shows the way

Protects the environment and your pocket

HYDAC Optimicron® makes high energy savings possible over the whole service life of the filter element. This protects valuable resources and reduces the CO_2 emissions.



Our contribution to sustainability.

Energy efficient innovations are the main focus of our developments, so that systems operate more economically.

Optimicron® Power	Optimised filter elements for applications in power stations and rotary presses using Stat-Free® technology
Optimicron® Pulse	Optimised filter elements for applications with powerful pulsations using Stat-Free® technology
Optimicron® Pulp & Paper	Optimised filter elements for use in paper mills
For your application	Optimised filter elements for your application.

NOTES

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E-Mail: filter@hydac.com

Optimicron® Power Filter Elements ON/PO

for power plant applications
up to 10 bar, filtration rating 5, 10 and 20 µm

Optimicron® Power

1. OPTIMICRON® POWER-ELEMENT

1.1 DESCRIPTION

The new filter elements in the Optimicron® Power series demonstrate impressive levels of robustness, safety and a particularly low pressure drop. They are compact in design and enable homogeneous flow of the fluid thanks to the innovative filter mesh pack structure.

Optimicron® Power elements have been designed to meet the requirements of the API 614 Standard.

The Stat-Free® technology incorporated into Optimicron® Power elements also ensures an increased level of operational safety by preventing electrostatic charging on the filter element. As a result, the service life of the oil is also considerably increased.

1.2 STAT-FREE® TECHNOLOGY INCLUDED

As standard, Optimicron® Power elements are equipped with the tried-and-tested Stat-Free® technology (to prevent electrostatic charging in the system).
As a result of increasing environmental awareness worldwide, operators are to a greater extent using zinc-free and ashless oils, such as bio oils which have very low conductivity. In these oils, electrostatic discharges are a common occurrence in the form of sparking, for example on the filter element or in the tank. Depending on the gas composition in and around the tank, sparking can cause deflagrations or explosions. Furthermore, the discharges can cause a chemical reaction in the oil, giving rise to oil ageing products.

1.3 GENERAL DATA

Collapse stability	10 bar for return line filter elements
Temperature range	-30 °C to +100 °C For sealing material FPM to -10 °C
Flow direction	From outside to inside
Filtration rating	5, 10, 20 µm
Bypass cracking pressure	Return line filter element (**"R"**): standard 3 bar Return line filter element for API applications (**"A"**): Without bypass valve as standard (others on request)
Category of filter element	Single use element

Oil ageing products can be deposited in the system and can clog up expensive system components. In addition, the filtration efficiency of the filter elements is impaired by sparking due to the holes burned in the filter mesh pack which in turn can lead to reduced retention of system contamination.
The Stat-Free® technology incorporated into Optimicron® Power elements slows down the oil ageing described above because the special filter mesh pack design prevents electrical charging in the system. This means that the service life of both the oil and the components can be extended. The Stat-Free® technology prevents the phenomenon of electrostatic charging and therefore the sparking in the system. It can be used in every conceivable application, irrespective of oil type.

1.4 INNOVATIVE OUTER WRAP WITH IMPROVED DIFFUSER EFFECT FOR PRINTING WITH CUSTOMER LOGO

Since the outer wrap can be printed with the customer logo, it also acts as an advertising medium for the OEM and guarantees security of the spares business. At the same time, the user can be certain of obtaining an original spare part. Particular benefit: the logo remains perfectly legible even in the contaminated condition.

1.5 COMPATIBILITY WITH HYDRAULIC FLUIDS TO ISO 2943

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant fluids HFA, HFB, HFC and HFD
- Operating fluids with high water content (>50% water content) on request

2. MODEL CODE

2.1 MODEL CODE FOR STANDARD RETURN LINE FILTER ELEMENTS

(Can be used in the following filters: RFL, RFLD)

0660 R 010 ON/PO /-KB

Size
0110, 0240, 0330, 0500, 0660, 0850, 0950, 1300, 1700, 2600, 2700

Type
R Return line filter element

Filtration rating in µm
005, 010, 020

Filter material of element
ON/PO Optimicron® Power, collapse stability up to 10 bar

Supplementary details
V FPM (Viton) seal
KB without bypass valve

2.2 MODEL CODE FOR RETURN LINE FILTER ELEMENTS IN AFLD AND ALFS FILTERS

0880 A 010 ON/PO /-V

Size
0110, 0120, 0230, 0240, 0330, 0500, 0540, 0880, 1400, 2700

Type
A Filter elements to API standards

Filtration rating in µm
010

Filter material of element
ON/PO Optimicron® Power, collapse stability up to 10 bar

Supplementary details
V FPM (Viton) seal

3. FILTER CALCULATION / SIZING

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

$\Delta p_{total} = \Delta p_{housing} + \Delta p_{element}$

$\Delta p_{housing}$ = see housing curve in the relevant filter brochure

$$\Delta p_{element} = Q \cdot \frac{SK^*}{1000} \cdot \frac{viscosity}{30}$$

(*see point 4.1)

4. ELEMENT CHARACTERISTICS

4.1 GRADIENT COEFFICIENTS FOR FILTER ELEMENTS

The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

Return line filter element "R"...ON/PO			
Size	5 µm	10 µm	20 µm
0110	3.63	3.08	2.03
0240	1.32	1.12	0.72
0330	0.81	0.69	0.44
0500	0.53	0.45	0.29
0660	0.35	0.30	0.19
0850	0.28	0.24	0.16
0950	0.25	0.21	0.14
1300	0.18	0.15	0.10
1700	0.13	0.11	0.07
2600	0.08	0.07	0.05
2700	0.08	0.07	0.05

Return line filter element "A"...ON/PO	
Size	10 µm
0110	3.08
0120	1.37
0230	0.68
0240	1.12
0330	0.69
0500	0.45
0540	0.33
0880	0.14
1400	0.09
2700	0.07

For information on bypass valve curves, please see Filter Element (Quick Selection) brochure no.: E 7.221../..

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Optimicron® Pulse Filter Elements ON/PS / OH/PS

for applications with strong pulsations
up to 210 bar, filtration rating 3, 5, 10 and 20 µm

Optimicron® Pulse

1. OPTIMICRON® PULSE ELEMENT

1.1 DESCRIPTION

The new application-specific filter elements in the Optimicron® Pulse series are notable for their special fatigue strength in applications which are subject to extreme pulsations.

Pressure fluctuations in hydraulic systems can occur, for example, when cylinder pistons move or accumulators are charged. The frequency of pressure fluctuations varies considerably depending on the application. On injection moulding machines, the movement of the clamping unit causes large pressure fluctuations, often with an extremely high cycle rate. The new HYDAC Optimicron® Pulse filter element can withstand these dynamic stresses. Special flexible materials in the filter mesh pack provide the filter element with a high fatigue strength. Fatigue fractures in the filter mesh pack and penetration of contamination to the clean side are therefore prevented.

The innovative HELIOS pleat geometry ensures a free cross-sectional area even at high flow rates and as a result delivers a lower differential pressure.

Additionally, the Optimicron® Pulse filter element is fitted with the tried and tested Stat-Free® technology, which effectively prevents electrostatic discharges in the hydraulic system.

1.2 GENERAL DATA

Collapse stability	ON/PS: 20 bar OH/PS: 210 bar
Temperature range	-30 °C to +100 °C For sealing material FPM to -10 °C
Flow direction	From outside to inside
Filtration rating	3, 5, 10, 20 µm
Bypass cracking pressure	Pressure filter element ("**D**"): Without bypass valve as standard (bypass valve on request)
Category of filter element	Single use element

1.3 STAT-FREE TECHNOLOGY INCLUDED

As standard, Optimicron® Pulse elements are equipped with the tried-and-tested Stat-Free® technology (to prevent electrostatic charging in the system).
As a result of increasing environmental awareness worldwide, operators are to a greater extent using zinc-free and ashless oils, such as bio oils which have very low conductivity. In these oils, electrostatic discharges are a common occurrence in the form of sparking, for example on the filter element or in the tank. Depending on the gas composition in and around the tank, sparking can cause deflagrations or explosions. Oil ageing products can be deposited in the system and can clog up expensive system components.
In addition, the filtration efficiency of the filter elements is impaired by sparking due to the holes burned in the filter mesh pack which in turn can lead to reduced retention of system contamination.
The Stat-Free® technology incorporated into Optimicron® Pulse elements slows down the oil ageing described above because the special filter mesh pack design prevents electrical charging in the system. This means that the service life of both the oil and the components can be extended. The Stat-Free® technology prevents the phenomenon of electrostatic charging and therefore the sparking in the system. It can be used in every conceivable application, irrespective of oil type.

1.4 INNOVATIVE OUTER WRAP WITH INCREASED ROBUSTNESS AND IMPROVED DIFFUSER EFFECT FOR PRINTING WITH CUSTOMER LOGO

Since the outer wrap can be printed with the customer logo, it also acts as an advertising medium for the OEM and guarantees security of the spares business. At the same time, the user can be certain of obtaining an original spare part. Particular benefit: the logo remains perfectly legible even in the contaminated condition.

1.5 COMPATIBILITY WITH HYDRAULIC FLUIDS TO ISO 2943

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant fluids HFA, HFB, HFC and HFD
- Operating fluids with high water content (>50% water content) on request

2. MODEL CODE

2.1 MODEL CODE FOR STANDARD PRESSURE FILTER ELEMENTS

(For use in filters: LF, LFF, LPF, DF, DFF, DF…MHA, DF…MHE, DFZ)

0660 D 010 ON/PS /-V

Size
0030, 0060, 0110, 0140, 0160, 0240, 0260, 0280, 0330, 0500, 0660, 0990, 1320, 1500

Type
D Pressure filter element

Filtration rating in µm
003, 005, 010, 020

Filter material of element
ON/PS Optimicron® Pulse, collapse stability up to 20 bar
OH/PS Optimicron® Pulse, collapse stability up to 210 bar

Supplementary details
V FPM (Viton) seal

3. FILTER CALCULATION / SIZING

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

$\Delta p_{total} = \Delta p_{housing} + \Delta p_{element}$

$\Delta p_{housing}$ = see housing curve in the relevant filter brochure

$$\Delta p_{element} = Q \cdot \frac{SK^*}{1000} \cdot \frac{viscosity}{30}$$

(*see Point 4.1)

4. ELEMENT CHARACTERISTICS

4.1 GRADIENT COEFFICIENTS FOR FILTER ELEMENTS

The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

Pressure filter element "D"...ON/PS				
Size	3 µm	5 µm	10 µm	20 µm
0030	63.9	43.3	25.1	11.3
0035	23.6	19.0	16.3	9.3
0055	13.7	11.0	8.9	4.8
0060	28.9	20.4	14.5	7.9
0110	14.9	10.7	7.3	3.7
0140	12.8	8.2	5.3	2.9
0160	13.1	8.8	5.5	3.5
0240	8.2	6.1	4.3	2.3
0260	1.7	7.3	4.8	2.5
0280	4.0	3.1	2.0	1.3
0330	8.6	3.9	3.0	1.7
0500	3.0	2.4	1.5	1.1
0660	2.3	1.8	1.1	0.8
0990	2.0	1.2	0.7	0.5
1320	1.1	0.9	0.5	0.4
1500	1.1	0.9	0.5	0.4

Pressure filter element "D"...OH/PS				
Size	3 µm	5 µm	10 µm	20 µm
0030	87.5	59.3	34.4	15.5
0035	32.3	26.0	22.3	12.7
0055	18.8	15.1	12.2	6.6
0060	39.6	28.0	19.9	10.8
0110	20.4	14.7	10.0	5.1
0140	17.5	11.2	7.2	4.0
0160	18.0	12.1	7.6	4.8
0240	11.2	8.4	5.9	3.2
0260	2.3	10.0	6.6	3.4
0280	5.5	4.3	2.8	1.8
0330	6.7	5.3	4.1	2.3
0500	4.1	3.3	2.1	1.5
0660	3.1	2.5	1.5	1.1
0990	2.0	1.6	1.0	0.7
1320	1.5	1.2	0.7	0.6
1500	1.5	1.2	0.7	0.6

For information on bypass valve curves, please see Filter Element (Quick Selection) brochure no.: E 7.221../..

NOTE

The information in this brochure relates to the operating conditions and applications described.
For applications or operating conditions not described, please contact the relevant technical department.
Subject to technical modifications.

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Optimicron® Pulp & Paper Filter Elements ON/PP

for use in paper mills
up to 10 bar, filtration rating 5 µm

1. OPTIMICRON® PULP & PAPER ELEMENT

1.1 DESCRIPTION

Drawing on HYDAC's many years of experience in the paper and pulp industry our new Optimicron® Pulp & Paper series elements have been specially developed for use in paper mills. Typically they are used in classic lubrication applications such as the dry and wet end, in the calender and in the cooling oil filtration circuit of the press section.

Thanks to innovative characteristics such as
the HELIOS pleat geometry and the optimised micro-glass media, the new industry-specific filter elements satisfy the typical requirements demanded of a filter element in such applications.

1.2 GENERAL DATA

Collapse stability	10 bar for return line filter elements
Temperature range	-30 °C to +100 °C For sealing material FPM to -10 °C
Flow direction	From outside to inside
Filtration rating	5 µm
Bypass cracking pressure	Return line filter element ("**R**"): standard 3 bar (others on request)
Category of filter element	Single use element

1.3 STAT-FREE® ELEMENT TECHNOLOGY OPTIONAL

By completely revising the materials used, e.g. through the use of conductive plastics, fully discharge-capable filter elements are the result. Electrical charging of the filter elements during operation has therefore been reduced to a negligible level. The risks of sudden sparking and the subsequent formation of soot or sludge in the oil are therefore reliably eliminated.

With the new Stat-Free® filter elements, HYDAC has for the first time succeeded in combining excellent electrostatic characteristics with filtration performance. Unprecedented low charge generation in the filter element and in the system fluid is achieved with a new type of filter mesh pack and element design.

1.4 INNOVATIVE OUTER WRAP WITH IMPROVED DIFFUSER EFFECT FOR PRINTING WITH CUSTOMER LOGO

Since the outer wrap can be printed with the customer logo, it also acts as an advertising medium for the OEM and guarantees security of the spares business. At the same time, the user can be certain of obtaining an original spare part. Particular benefit: the logo remains perfectly legible even in the contaminated condition.

1.5 COMPATIBILITY WITH HYDRAULIC FLUIDS TO ISO 2943

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant fluids HFA, HFB, HFC and HFD
- Operating fluids with high water content (>50% water content) on request

2. MODEL CODE

2.1 MODEL CODE FOR STANDARD RETURN LINE FILTER ELEMENTS

(Can be used in filters: NF und NFD, starting at size 1340)

1300 R 005 ON/PP /-KB

Size
1300, 2600

Type
R Return line filter element

Filtration rating in µm
005

Filter material of element
ON/PP Optimicron® Pulp & Paper, collapse stability up to 10 bar

Supplementary details
V FPM (Viton) seal
KB without bypass valve
SFREE Stat-Free® element technology

3. FILTER CALCULATION / SIZING

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

$\Delta p_{total} = \Delta p_{housing} + \Delta p_{element}$

$\Delta p_{housing}$ = see housing curve in the relevant filter brochure

$$\Delta p_{element} = Q \cdot \frac{SK^*}{1000} \cdot \frac{viscosity}{30}$$

(*see Point 4.1)

4. ELEMENT CHARACTERISTICS

4.1 GRADIENT COEFFICIENTS FOR FILTER ELEMENTS

The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

Return line filter element "R"...ON/PP	
Size	5 µm
1300	1.00
2600	0.45

For information on bypass valve curves, please see Filter Element (Quick Selection) brochure no.: E 7.221../..

NOTE

The information in this brochure relates to the operating conditions and applications described.
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Optimicron® Filter Elements ON

up to 20 bar,
filtration rating 1, 3, 5, 10, 15 and 20 µm

Optimicron®

Please note:
Ongoing conversion from Betamicron® (BN4HC) to Optimicron® (ON)!

1. OPTIMICRON®

1.1 DESCRIPTION

The new Optimicron® filter elements have been optimised in respect of filtration performance and energy efficiency. They offer the best combination when it comes to separation efficiency, service life and differential pressure.

As a complete package the innovative characteristics of the new technology have a very positive impact on the differential pressure of the elements. For example, the new HELIOS filter mesh pack geometry has the effect of stabilising the pleats and increasing the available area of incident flow. The obvious advantage is improved flow conditions and as a result lower differential pressure.

HELIOS

The efficient micro-glass media forming the core of the filter element delivers first class filtration efficiency and a low differential pressure over the whole lifetime of the element and is now also available in 1 and 15 µm ratings.

The new design of the filter mesh pack and the combination of (up to seven) exclusive filtration layers has a particularly favourable effect on the differential pressure. So for example, a drainage layer with asymmetrical thread thickness as the first layer on the contaminated side channels the fluid and at the same time provides extensive and soft support of the other media. The penultimate filter layer, the so-called integrated drainage layer, ensures directed flow and prevents impact losses, dead spaces and turbulence which usually occur when wire mesh is used exclusively.

1.2 GENERAL DATA

Collapse stability	20 bar
Temperature range	-30 °C to +100 °C For sealing material FPM to -10 °C
Flow direction	From outside to inside
Filtration rating	1, 3, 5, 10, 15, 20 µm
Bypass cracking pressure	Pressure filter element (**"D"**): Without bypass valve as standard Return line filter element (**"R"**): Standard 3 bar (others on request) Return line filter element (**"RD"**): Standard 3.4 bar
Category of filter element	Single use element

1.3 STAT-FREE® TECHNOLOGY OPTIONAL

By completely revising the materials used, e.g. through the use of conductive plastics, fully discharge-capable filter elements are the result.

Electrical charging of the filter elements during operation has therefore been reduced to a negligible level. The risks of sudden sparking and the subsequent formation of soot or sludge in the oil are therefore reliably eliminated.

With the new Stat-Free® filter elements, HYDAC has for the first time succeeded in combining excellent electrostatic characteristics with filtration performance. Unprecedented low charge generation in the filter element and in the system fluid is achieved with a new type of filter mesh pack and element design.

1.4 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant fluids HFA, HFB, HFC and HFD
- Operating fluids with high water content (>50% water content) on request

1.5 INNOVATIVE OUTER WRAP WITH IMPROVED DIFFUSER EFFECT FOR PRINTING WITH CUSTOMER LOGO

Since the outer wrap can be printed with the customer logo, it also acts as an advertising medium for the OEM and guarantees security of the spares business. At the same time, the user can be certain of obtaining an original spare part. Particular benefit: the logo remains perfectly legible even in the contaminated condition.

1. APPLICATION

Optimicron® filter elements are intended to be used in all industries where particular importance is placed on first class filtration efficiency, high cleanliness classes as well as on significant savings in energy costs and on sustainable filtration.

2. MODEL CODE

2.1 MODEL CODE FOR STANDARD PRESSURE FILTER ELEMENTS

(Can be used in the following filters: LFM, MFM, MFM…/-OIU, MFM..L.., DFM, HFM, LPF, LF, LFF, MDF, HDF, HDFF, DF, DFF, DFFX, FLND, FMND, DFDK, DF…MHA, DF…MHE, DF…M A, DF…M P, DFZ, DF…Q E, DFP, DFPF)

0660 D 010 ON /-V

Size
0030, 0035, 0055, 0060, 0075, 0095, 0110, 0140, 0160,
0240, 0260, 0280, 0300, 0330, 0450, 0500, 0650, 0660,
0900, 0990, 1320, 1500

Type
D Pressure filter element

Filtration rating in µm
001, 003, 005, 010, 015, 020

Filter material of element
ON Collapse stability up to 20 bar

Supplementary details
V FPM (Viton) seal
SFREE Stat-Free® element technology

2.2 MODEL CODE FOR STANDARD RETURN LINE FILTER ELEMENTS

(Can be used in the following filters: RFM, RF, RFD, RFL, RFLD, NF, NFD)

0660 R 010 ON /-V

Size
0030, 0060, 0075, 0090, 0110, 0150, 0160, 0165, 0185,
0195, 0210, 0240, 0260, 0270, 0280, 0330, 0450, 0500,
0580, 0600, 0660, 0750, 0850, 0950, 1300, 1700, 2600

Type
R Return line filter element

Filtration rating in µm
001, 003, 005, 010, 015, 020

Filter material of element
ON Collapse stability up to 20 bar

Supplementary details
V FPM (Viton) seal
KB without bypass valve
SFREE Stat-Free® element technology

2.3 MODEL CODE FOR RETURN LINE FILTER ELEMENTS IN PRESSURE FILTERS

(Can be used in the following filters: LPF…/-TH, LPF…GGA)

0241 RD 010 ON /-V

Size
0161, 0241, 0261, 0281

Type
RD Return line filter element for pressure filters

Filtration rating in µm
001, 003, 005, 010, 015, 020

Filter material of element
ON Collapse stability up to 20 bar

Supplementary details
V FPM (Viton) seal

3. FILTER CALCULATION / SIZING

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

$\Delta p_{total} = \Delta p_{housing} + \Delta p_{element}$

$\Delta p_{housing}$ = see housing curve in the relevant filter brochure

$$\Delta p_{element} = Q \cdot \frac{SK^*}{1000} \cdot \frac{viscosity}{30}$$

(*see Point 4.1)

4. ELEMENT CHARACTERISTICS

4.1 GRADIENT COEFFICIENTS FOR FILTER ELEMENTS

The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

Pressure filter element "D"...ON						
Size	**1 µm**	**3 µm**	**5 µm**	**10 µm**	**15 µm**	**20 µm**
0030	77.8	63.9	43.3	22.8	14.0	11.3
0035	50.2	21.3	17.1	13.7	10.0	7.44
0055	26.0	12.3	9.90	7.90	5.17	3.84
0060	53.5	26.0	18.3	12.1	9.78	6.32
0075	16.7	8.40	6.75	5.40	3.33	2.48
0095	13.2	6.74	5.40	4.33	2.62	1.92
0110	25.8	13.4	9.61	6.06	4.63	2.99
0140	19.9	11.5	7.39	4.38	3.54	2.29
0160	18.5	11.0	7.70	4.10	3.71	3.18
0240	11.5	6.90	5.34	3.19	2.44	2.10
0260	8.18	4.96	3.87	2.31	1.83	1.44
0280	5.54	3.37	2.74	1.49	1.36	1.17
0300	14.6	8.90	7.13	4.88	2.80	2.61
0330	8.23	4.19	3.37	2.46	1.55	1.22
0450	7.30	4.45	3.52	2.39	1.40	1.26
0500	5.05	2.57	2.07	1.23	0.95	0.75
0650	4.46	2.69	2.20	1.47	0.86	0.81
0660	3.78	1.93	1.56	0.93	0.71	0.56
0900	3.37	2.10	1.67	1.10	0.65	0.63
0990	2.51	1.28	1.03	0.61	0.47	0.37
1320	1.85	0.97	0.76	0.45	0.35	0.27
1500	1.64	0.97	0.70	0.48	0.36	0.28

Return line element "R"...ON						
Size	**1 µm**	**3 µm**	**5 µm**	**10 µm**	**15 µm**	**20 µm**
0030	89.8	68.4	43.9	26.8	16.8	14.7
0060	47.2	23.6	17.2	9.82	9.01	6.85
0075	25.6	19.4	13.4	7.31	4.80	4.40
0090	22.5	13.1	9.49	6.07	4.30	3.21
0110	22.3	13.1	8.87	5.40	4.26	3.24
0150	13.4	7.80	5.65	3.61	2.55	1.91
0160	16.0	8.00	5.68	3.22	2.69	2.32
0165	14.1	9.44	7.37	4.02	2.25	2.42
0185	10.4	7.44	5.74	2.93	1.65	1.41
0195	7.66	5.48	4.22	2.16	1.22	1.04
0210	5.66	3.28	2.55	1.53	1.00	0.88
0240	10.4	5.18	3.66	2.27	1.84	1.41
0270	3.66	2.12	1.65	0.99	0.65	0.57
0280	5.10	2.57	2.08	1.43	1.06	0.80
0330	8.09	3.72	2.73	1.48	1.28	1.02
0450	6.33	3.17	2.30	1.40	1.00	0.85
0500	5.27	2.60	1.90	1.09	0.84	0.69
0580	2.49	1.23	0.90	0.53	0.40	0.34
0600	2.35	1.23	1.10	0.61	0.42	0.34
0660	3.57	1.69	1.21	0.67	0.57	0.45
0750	2.11	1.12	0.92	0.53	0.34	0.32
0850	2.77	1.31	1.00	0.58	0.44	0.36
0950	2.39	1.03	0.79	0.48	0.38	0.31
1300	1.72	0.72	0.59	0.35	0.32	0.22
1700	1.35	0.64	0.53	0.28	0.25	0.18
2600	0.84	0.36	0.29	0.18	0.16	0.11
2700	0.91	0.35	0.30	0.18	0.17	0.08

Return line element "RD"...ON						
Size	**1 µm**	**3 µm**	**5 µm**	**10 µm**	**15 µm**	**20 µm**
0161	17.71	10.67	8.76	4.97	3.41	3.04
0241	10.86	6.54	5.37	3.05	2.09	1.87
0261	7.19	4.33	3.56	2.02	1.38	1.24
0281	4.47	2.69	2.21	1.25	0.86	0.77

For information on bypass valve curves, please see Filter Element (Quick Selection) brochure no.: E 7.221../..

NOTES

NOTE

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Betamicron® Filter Elements BN4HC/BH4HC

up to 210 bar, filtration rating 3, 5, 6, 10, 20, 25 µm

1. BETAMICRON® ELEMENT

1.1 DESCRIPTION

The 3-stage structure of Betamicron® filter elements ensures the maximum contamination retention and filtration performance. An additional drainage layer directs the fluid flow with optimal efficiency, achieving particularly favourable Δp/Q characteristics.

An innovative bonding process used for the longitudinal seam guarantees that the cut ends of the mesh pack remain completely sealed even under high load variations. This eliminates the possibility of particles crossing from the contaminated to the clean side.

To prevent the formation of zinc soap, which occurs mainly in conjunction with water-based fluids (HFA / HFC) and bio oils, no components containing zinc are utilized.

The metal tube which forms a stable core inside the element is constructed as a spiral lock seam tube. This provides consistent stability and a significant reduction in element weight.

The pleated filter mesh pack is encased in a stable outer wrap. This wrap distributes the incoming fluid evenly over the mesh pack. In addition the mesh pack is not directly exposed to the flow, and this protects it from pulsating flows. In this way, the element achieves extremely high fatigue strength values. Moreover, the mesh pack is protected from mechanical damage.

1.2 GENERAL DATA

Collapse stability	BN4HC: 20 bar BH4HC: 210 bar
Temperature range	-30 °C to +100 °C For sealing material FPM to -10 °C
Flow direction	From outside to inside
Filtration rating	3, 5, 6, 10, 20, 25 µm
Bypass cracking pressure	Pressure filter element (**"D"**): Without bypass valve as standard Pressure filter element to DIN 24550 (**"DN"**): Without bypass valve as standard Pressure filter element for MFX filter (**"MX"**): standard 3.5 bar Return line filter element to DIN 24550 (**"RN"**): standard 3.5 bar (others on request)
Category of filter element	Single use element

1.3 STAT-FREE® TECHNOLOGY OPTIONAL

By completely revising the materials used, e.g. through the use of conductive plastics, fully discharge-capable filter elements are the result.

Electrical charging of the filter elements during operation has therefore been reduced to a negligible level. The risks of sudden sparking and the subsequent formation of soot or sludge in the oil are therefore reliably eliminated.

With the new Stat-Free® filter elements, HYDAC has for the first time succeeded in combining excellent electrostatic characteristics with filtration performance. Unprecedented low charge generation in the filter element and in the system fluid is achieved with a new type of filter mesh pack and element design.

1.4 OUTER WRAP PRINTED WITH CUSTOMER LOGO

Since the outer wrap can be printed with the customer logo, it also acts as an advertising medium for the OEM and guarantees security of the spares business. At the same time, the user can be certain of obtaining an original spare part. Particular benefit: the logo remains perfectly legible even in the contaminated condition.

1.5 COMPATIBILITY WITH HYDRAULIC FLUIDS TO ISO 2943

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant fluids HFA, HFB, HFC and HFD
- Operating fluids with high water content (>50% water content) on request

2. MODEL CODE

2.1 MODEL CODE FOR STANDARD PRESSURE FILTER ELEMENTS

(Can be used in the following filters: DFM, LPF, LF, LFF, MDF, HDF, HDFF, DF, DFF, DFFX, FLND, FMND, DFDK, DF... MHA, DF...MHE, DF...M A, DF...M P, DFZ, DF...Q E, DFP, DFPF)

0660 D 010 BH4HC /-V

Size
0030, 0035, 0055, 0060, 0075, 0095, 0110, 0140, 0160, 0240, 0260, 0280, 0300, 0330, 0450, 0500, 0650, 0660,0900, 0990, 1320, 1500

Type
D Pressure filter element

Filtration rating in µm
003, 005, 010, 020

Filter material of element
BH4HC Collapse stability up to 210 bar

Supplementary details
V FPM (Viton) seal
SFREE Stat-Free® element technology

2.2 MODEL CODE FOR PRESSURE FILTER ELEMENTS TO DIN 24550

(Can be used in the following filters: FLN, LFN, LFNF, DFN, DFNF, FLND, FMND, DFDKN)

0100 DN 010 BN4HC /-V

Size
0040, 0063, 0100, 0160, 0250, 0400

Type
DN Pressure filter element to DIN 24550

Filtration rating in µm
003, 006, 010, 025

Filter material of element
BN4HC Collapse stability up to 20 bar
BH4HC Collapse stability up to 210 bar

Supplementary details
V FPM (Viton) seal
SFREE Stat-Free® element technology

2.3 MODEL CODE FOR PRESSURE FILTER ELEMENTS IN MFX FILTERS

0100 MX 010 BN4HC /-V

Size
0100, 0200

Type
MX Pressure filter element for MFX filter

Filtration rating in µm
003, 005, 010, 020

Filter material of element
BN4HC Collapse stability up to 20 bar

Supplementary details
V FKM (Viton) seal

2.4 MODEL CODE FOR RETURN LINE FILTER ELEMENTS TO DIN 24550

(Can be used in the following filters: RFN, RFND, RFLN, RFLND)

0100 RN 010 BN4HC /-V

Size
0040, 0063, 0100, 0160, 0250, 0400, 0630, 1000

Type
RN Return line filter element to DIN 24550

Filtration rating in µm
003, 006, 010, 025

Filter material of element
BN4HC Collapse stability up to 20 bar

Supplementary details
V FPM (Viton) seal
SFREE Stat-Free® element technology

3. FILTER CALCULATION / SIZING

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

$\Delta p_{total} = \Delta p_{housing} + \Delta p_{element}$

$\Delta p_{housing}$ = see housing curve in the relevant filter brochure

$$\Delta p_{element} = Q \cdot \frac{SK^*}{1000} \cdot \frac{viscosity}{30}$$

(*see point 4.1)

4. ELEMENT CHARACTERISTICS

4.1 GRADIENT COEFFICIENTS FOR FILTER ELEMENTS

The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

Pressure filter element "D"...BH4HC				
Size	3 µm	5 µm	10 µm	20 µm
0030	91.2	50.7	36.3	19.0
0035	47.8	28.1	16.8	10.5
0055	24.2	14.2	8.5	5.3
0060	58.6	32.6	18.1	12.2
0110	25.4	14.9	8.9	5.6
0140	19.9	11.3	8.1	4.3
0160	16.8	10.4	5.9	4.4
0240	10.6	6.8	3.9	2.9
0260	8.1	4.8	3.3	1.9
0280	5.7	3.4	1.8	1.6
0300	16.0	8.9	7.1	3.3
0330	7.7	4.5	2.8	2.0
0450	7.8	4.3	3.4	1.6
0500	4.2	2.6	1.5	1.2
0650	4.7	2.6	2.1	1.0
0660	3.3	1.9	1.0	0.9
0900	3.5	2.0	1.6	0.7
0990	2.2	1.3	0.8	0.6
1320	1.6	1.0	0.6	0.4
1500	1.4	0.8	0.6	0.5

Pressure filter element "DN"...BN4HC				
Size	3 µm	6 µm	10 µm	25 µm
0040	23.9	14.9	8.6	6.6
0063	16.3	9.9	6.0	4.6
0100	11.9	6.6	4.0	3.2
0160	7.9	5.1	3.4	2.6
0250	5.1	3.2	2.1	1.8
0400	3.2	2.0	1.3	1.0

Pressure filter element "DN"...BH4HC				
Size	3 µm	6 µm	10 µm	25 µm
0040	40.4	24.8	16.4	10.9
0063	29.0	18.2	11.7	7.6
0100	19.0	11.7	7.7	5.3
0160	8.0	5.1	3.8	2.5
0250	5.4	3.4	2.8	1.9
0400	3.4	2.1	1.7	1.1

Pressure filter element "MX"...BN4HC				
Size	3 µm	5 µm	10 µm	20 µm
0100	12.0	9.0	4.6	3.4
0200	7.0	5.3	2.7	2.0

Return line filter element "RN"...BN4HC				
Size	3 µm	6 µm	10 µm	25 µm
0040	14.2	7.8	4.8	2.6
0063	9.5	5.2	3.4	1.8
0100	6.8	3.3	2.3	1.2
0160	3.6	1.8	1.2	0.5
0250	2.8	1.4	0.9	0.4
0400	2.2	1.6	1.3	1.0
0630	2.1	1.2	0.9	0.7
1000	0.7	0.5	0.4	0.3

4.2 CONTAMINATION RETENTION CAPACITY IN G

The contamination retention and particle filtration performance of an element are established in the multipass test to ISO 16889. This procedure with its precisely defined test conditions and a standard test dust (ISO MTD) enables the performance data of different elements to be compared.

Pressure filter element "D"...BH4HC				
Size	3 µm	5 µm	10 µm	20 µm
0030	3.0	2.9	3.2	3.7
0035	5.3	5.2	5.8	6.6
0055	10.5	10.3	11.5	13.0
0060	4.6	4.5	5.0	5.7
0110	10.1	9.9	10.9	12.4
0140	13.3	13.0	14.3	16.3
0160	12.9	12.6	13.9	15.9
0240	21.6	21.1	23.2	26.5
0260	48.1	47.1	51.8	59.1
0280	48.1	47.1	51.8	59.1
0300	17.0	16.6	18.3	20.9
0330	34.6	33.9	37.2	42.5
0450	35.0	34.2	37.6	42.9
0500	57.5	56.3	61.8	70.5
0650	58.3	57.1	62.8	71.6
0660	76.8	75.2	82.6	94.3
0900	77.3	75.7	83.1	94.8
0990	111.8	109.4	120.2	137.2
1320	153.8	150.7	165.5	188.8
1500	164.5	161.1	177.0	202.0

Pressure filter element "DN"...BN4HC				
Size	3 µm	6 µm	10 µm	25 µm
0040	5.2	5.6	6.3	7.0
0063	7.3	7.9	9.2	11.2
0100	15.4	16.5	18.6	20.6
0160	27.5	29.3	33.1	36.7
0250	38.1	41.7	48.6	59.0
0400	76.2	81.3	91.4	101.5

Pressure filter element "DN"...BH4HC				
Size	3 µm	6 µm	10 µm	25 µm
0040	4.1	4.4	5.2	6.2
0063	7.3	7.9	9.2	11.2
0100	12.2	13.2	15.5	18.9
0160	21.8	23.9	27.8	33.8
0250	38.1	41.7	48.6	59.0
0400	63.6	69.5	81.0	98.3

Pressure filter element "MX"...BN4HC				
Size	3 µm	5 µm	10 µm	20 µm
0100	24.2	27.8	27.8	28.8
0200	41.3	47.4	47.4	49.4

Return line filter element "RN"...BN4HC				
Size	3 µm	6 µm	10 µm	25 µm
0040	7.1	8.0	8.9	10.6
0063	13.0	14.7	16.3	19.6
0100	22.0	24.7	27.5	33.0
0160	36.2	40.7	45.3	54.2
0250	61.4	69.1	76.8	92.1
0400	88.2	99.2	110.2	132.3
0630	148.6	167.3	185.8	222.9
1000	151.8	170.8	189.8	227.8

For information on bypass valve curves, please see Filter Element (Quick Selection) brochure no.: E 7.221../..

NOTES

NOTE

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Mobilemicron® Filter Elements MM

up to 10 bar, filtration rating 8, 10, 15 µm

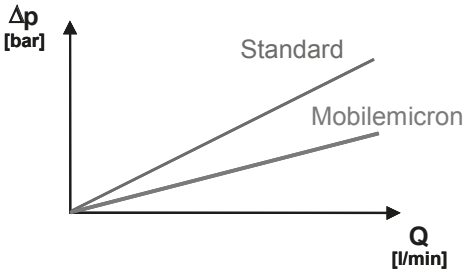
1. MOBILEMICRON® ELEMENT

1.1 DESCRIPTION

The use of Mobilemicron® element technology guarantees safe, reliable operation of your mobile machine.

The Mobilemicron® series of filter elements is characterized by an especially low pressure drop which makes them particularly suitable for use wherever high-viscosity oil is likely - especially at low temperatures during a cold start. When Mobilemicron® elements are used, compared to conventional hydraulic elements under the same ambient conditions, the Δp produced is lower and the flow rate is higher which results in a lower energy requirement.

Filtered flow during cold start



Thanks to its excellent cold start behaviour the Mobilemicron® element technology is used primarily in mobile applications but is also typically recommended for gear lubrication applications in systems with high temperature fluctuations and high-viscosity oils (>ISO VG 100).

1.2 GENERAL DATA

Collapse stability	10 bar for return line filter elements 20 bar for pressure filter elements
Temperature range	-30 °C to +100 °C For sealing material FPM to -10 °C
Flow direction	From outside to inside
Filtration rating	8, 10, 15 µm
Bypass cracking pressure	Return line filter element (**"R"**): standard 3 bar Pressure filter element for MFX filter (**"MX"**): standard 3.5 bar Return line filter element for RKM filter (**"RK"**): standard without bypass valve Return line filter element pressure filter (**"RD"**): standard without bypass valve (others on request)
Category of filter element	Single use element

1.3 STAT-FREE® ELEMENT TECHNOLOGY OPTIONAL

By completely revising the materials used, e.g. through the use of conductive plastics, fully discharge-capable filter elements are the result.

Electrical charging of the filter elements during operation has therefore been reduced to a negligible level. The risks of sudden sparking and the subsequent formation of soot or sludge in the oil are therefore reliably eliminated.

With the new Stat-Free® filter elements, HYDAC has for the first time succeeded in combining excellent electrostatic characteristics with filtration performance. Unprecedented low charge generation in the filter element and in the system fluid is achieved with a new type of filter mesh pack and element design.

1.4 OUTER WRAP PRINTED WITH CUSTOMER LOGO

Since the outer wrap can be printed with the customer logo, it also acts as an advertising medium for the OEM and guarantees security of the spares business. At the same time, the user can be certain of obtaining an original spare part. Particular benefit: the logo remains perfectly legible even in the contaminated condition.

1.5 COMPATIBILITY WITH HYDRAULIC FLUIDS TO ISO 2943

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant fluids HFA, HFB, HFC and HFD
- Operating fluids with high water content (>50% water content) on request

2. MODEL CODE

2.1 MODEL CODE FOR STANDARD RETURN LINE FILTER ELEMENTS

(Can be used in the following filters: RF, RFD, RFM, RFL, RFLD)

0660 R 010 MM /-V

Size
0075, 0090, 0150, 0165, 0185, 0195, 0210, 0270, 0330, 0500, 0660, 0850

Type
R Return line filter element

Filtration rating in µm
008, 010, 015

Filter material of element
MM Mobilemicron®, collapse stability up to 10 bar

Supplementary details
V FPM (Viton) seal
KB without bypass valve
SFREE Stat-Free® element technology

2.2 MODEL CODE FOR RETURN LINE FILTER ELEMENTS IN RKM FILTERS

0300 RK 010 MM /-V

Size
0080, 0100, 0120, 0151, 0201, 0251, 0300, 0350, 0400, 0800

Type
RK Return line filter element for RKM filter

Filtration rating in µm
008, 010, 015

Filter material of element
MM Mobilemicron®, collapse stability up to 10 bar

Supplementary details
V FPM (Viton) seal
SFREE Stat-Free® element technology

2.3 MODEL CODE FOR RD PRESSURE FILTER ELEMENTS

(Can be used in the following filters: LPF…/-TH, LPF…GGA)

0251 RD 010 MM /-V

Size
0161, 0241, 0261, 0281

Type
RD Pressure filter element

Filtration rating in µm
008, 010, 015

Filter material of element
MM Mobilemicron®, collapse stability up to 20 bar

Supplementary details
V FPM (Viton) seal
SFREE Stat-Free® element technology

2.4 MODEL CODE FOR PRESSURE FILTER ELEMENTS IN MFX FILTERS

0100 MX 010 MM /-V

Size
0100, 0200

Type
MX Pressure filter element for MFX filter

Filtration rating in µm
008, 010, 015

Filter material of element
MM Mobilemicron®, collapse stability up to 20 bar

Supplementary details
V FPM (Viton) seal
KB without bypass valve
SFREE Stat-Free® element technology

3. FILTER CALCULATION / SIZING

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

$\Delta p_{total} = \Delta p_{housing} + \Delta p_{element}$

$\Delta p_{housing}$ = see housing curve in the relevant filter brochure

$$\Delta p_{element} = Q \cdot \frac{SK^*}{1000} \cdot \frac{viscosity}{30}$$

(*see point 4.1)

4. ELEMENT CHARACTERISTICS

4.1 GRADIENT COEFFICIENTS FOR FILTER ELEMENTS

The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

Return line filter element "R"...MM			
Size	8 µm	10 µm	15 µm
0075	4.83	4.83	3.02
0090	4.60	4.60	2.15
0150	2.08	2.08	1.30
0165	2.66	2.66	1.66
0185	1.97	1.97	1.23
0195	1.45	1.13	0.69
0210	0.95	0.95	0.59
0270	0.58	0.58	0.36
0330	1.43	1.43	0.89
0500	0.94	0.94	0.59
0660	0.55	0.55	0.34
0850	0.42	0.42	0.26

Return line filter element "RK"...MM			
Size	8 µm	10 µm	15 µm
0080	2.48	2.48	1.59
0100	1.74	1.74	1.11
0120	1.40	1.40	0.90
0151	1.00	1.00	0.65
0201	0.75	0.75	0.47
0251	0.58	0.58	0.36
0300	0.62	0.62	0.39
0350	0.30	0.30	0.20
0400	0.56	0.56	0.35
0800	0.44	0.44	0.27

Pressure filter element "RD"...MM			
Size	8 µm	10 µm	15 µm
0161	3.53	3.53	2.29
0241	2.03	2.03	1.32
0261	1.31	1.31	0.85
0281	0.82	0.82	0.53

Pressure filter element "MX"...MM			
Size	8 µm	10 µm	15 µm
0100	2.70	2.70	2.20
0200	1.60	1.60	1.30

4.2 CONTAMINATION RETENTION CAPACITY IN G

The contamination retention and particle filtration performance of an element are established in the multipass test to ISO 16889. This procedure with its precisely defined test conditions and a standard test dust (ISO MTD) enables the performance data of different elements to be compared.

Return line filter element "R"...MM			
Size	8 µm	10 µm	15 µm
0075	5.4	5.4	6.4
0090	7.4	7.4	8.8
0150	11.8	11.8	13.9
0165	9.9	9.9	11.6
0185	13.6	13.6	16.0
0195	18.5	18.5	21.7
0210	32.8	32.8	38.7
0270	50.8	50.8	59.9
0330	21.8	21.8	25.7
0500	33.4	33.4	39.4
0660	53.7	53.7	63.3
0850	69.1	69.1	81.4

Return line filter element "RK"...MM			
Size	8 µm	10 µm	15 µm
0080	11.0	11.0	13.3
0100	16.3	16.3	19.6
0120	20.7	20.7	25.0
0151	26.6	26.6	31.4
0201	50.9	50.9	61.4
0251	61.9	61.9	74.7
0300	55.6	55.6	67.1
0350	87.0	87.0	105.0
0400	67.4	67.4	81.3
0800	86.3	86.3	104.2

Pressure filter element "RD"...MM			
Size	8 µm	10 µm	15 µm
0161	11.3	11.3	13.7
0241	18.7	18.7	22.6
0261	29.0	29.0	35.0
0281	46.6	46.6	56.2

Pressure filter element "MX"...MM			
Size	8 µm	10 µm	15 µm
0100	13.3	13.3	15.7
0200	22.7	22.7	26.8

For information on bypass valve curves, please see Filter Element (Quick Selection) brochure no.: E 7.221../..

NOTES

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Ecomicron®
Filter Elements ECON2
up to 10 bar, filtration rating 3, 5, 10, 20 µm

1. ECOMICRON® ELEMENT

1.1 DESCRIPTION

With the introduction of the new Betamicron® element technology HYDAC has broken new ground in the field of filter technology: with its markedly improved filtration performance the new glass fibre technology delivers a significant reduction in operating costs of both machine and system.

In the second step we were able to incorporate the outstanding values of the new Betamicron®4 technology into the environmentally friendly all-plastic variant Ecomicron®. The result was the new filter element generation Ecomicron®2 with tried-and-tested full-plastic structure and improved performance data.

The typical HYDAC element construction has been retained: the unique outer wrap ensures optimum flow control and protects the high-grade filter medium; the pleated filter mesh pack stabilises the filter element for flow from outside to inside and makes maximum use of the glass fibre capacity.

1.2 GENERAL DATA

Collapse stability	10 bar
Temperature range	-30 °C to +100 °C For sealing material FPM to -10 °C
Flow direction	From outside to inside
Filtration rating	3, 5, 10, 20 µm
Bypass cracking pressure	Return line filter element (**"R"**): standard 3 bar Pressure filter element for MFX filter (**"MX"**): standard 3.5 bar (others on request)
Category of filter element	Single use element

1.3 OUTER WRAP PRINTED WITH CUSTOMER LOGO

Since the outer wrap can be printed with the customer logo, it also acts as

an advertising medium for the OEM and guarantees security of the spares business. At the same time, the user can be certain of obtaining an original spare part. Particular benefit: the logo remains perfectly legible even in the contaminated condition.

1.4 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant fluids HFA, HFB, HFC and HFD
- Operating fluids with high water content (>50% water content) on request

2. MODEL CODE

2.1 MODEL CODE FOR STANDARD RETURN LINE FILTER ELEMENTS

(Can be used in the following filters: RFM, NF, NFD)

0660 R 010 ECON2 /-V

Size
0075, 090, 150, 160, 165, 185, 195, 240, 280, 330, 500, 660, 750, 850, 950, 1300, 2600

Type
R Return line filter element

Filtration rating in µm
003, 005, 010, 020

Filter material of element
ECON2 Ecomicron®

Supplementary details
KB without bypass valve
V FKM (Viton) seal

2.2 MODEL CODE FOR PRESSURE FILTER ELEMENTS IN MFX FILTERS

0100 MX 010 ECON2 /-V

Size
0100, 0200

Type
MX Pressure filter element for MFX filter

Filtration rating in µm
003, 005, 010, 020

Filter material of element
ECON2 Ecomicron®

Supplementary details
KB without bypass valve
V FKM (Viton) seal

3. FILTER CALCULATION / SIZING

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

$\Delta p_{total} = \Delta p_{housing} + \Delta p_{element}$

$\Delta p_{housing}$ = see housing curve in the relevant filter brochure

$$\Delta p_{element} = Q \cdot \frac{SK^*}{1000} \cdot \frac{viscosity}{30}$$

(*see point 4.1)

4. ELEMENT CHARACTERISTICS

4.1 GRADIENT COEFFICIENTS FOR FILTER ELEMENTS

The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

Return line filter element "R"...ECON2				
Size	3 µm	5 µm	10 µm	20 µm
0075	22.0	14.2	8.1	4.4
0090	14.9	10.1	6.7	3.2
0150	8.9	6.0	4.0	1.9
0160	9.5	5.9	3.8	2.9
0165	11.2	7.8	4.5	2.4
0185	8.9	6.1	3.3	1.8
0195	6.6	4.5	2.4	1.3
0240	6.2	3.8	2.6	1.8
0280	3.1	2.2	1.6	1.0
0330	4.2	2.7	1.7	1.2
0500	3.0	1.9	1.3	0.8
0660	1.9	1.2	0.8	0.5
0750	1.3	0.9	0.6	0.4
0850	1.5	1.0	0.7	0.4
0950	1.2	0.8	0.5	0.4
1300	0.8	0.6	0.4	0.3
1700	0.7	0.5	0.3	0.2
2600	0.4	0.3	0.2	0.1

Pressure filter element "MX"...ECON2				
Size	3 µm	5 µm	10 µm	20 µm
0100	13.0	10.0	6.5	4.8
0200	8.0	5.9	3.8	2.8

4.2 CONTAMINATION RETENTION CAPACITY IN G

Return line filter element "R"...ECON2				
Size	3 µm	5 µm	10 µm	20 µm
0075	10.3	11.4	13.7	15.5
0090	12.2	13.5	16.2	18.3
0150	20.4	22.6	27.2	30.8
0160	18.6	20.7	24.9	28.1
0165	18.7	20.7	24.9	28.2
0185	25.6	28.4	34.1	38.6
0195	28.1	31.1	37.5	42.4
0240	29.3	32.5	39.1	44.2
0280	62.3	69.0	83.0	93.9
0330	38.4	42.6	51.2	57.9
0500	58.9	65.3	78.6	88.9
0660	87.1	96.5	116.1	131.3
0750	147.1	163.0	196.1	221.9
0850	112.1	124.2	149.5	169.1
0950	130.0	144.1	173.3	196.1
1300	181.0	200.7	241.4	273.1
1700	229.8	254.7	306.4	346.6
2600	369.4	409.4	492.5	557.2

Pressure filter element "MX"...ECON2				
Size	3 µm	5 µm	10 µm	20 µm
0100	25.6	29.9	29.9	33.0
0200	43.8	50.5	50.5	56.0

For information on bypass valve curves, please see Filter Element (Quick Selection) brochure no.: E 7.221../..

NOTE

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Wire Mesh Filter Elements W, W/HC

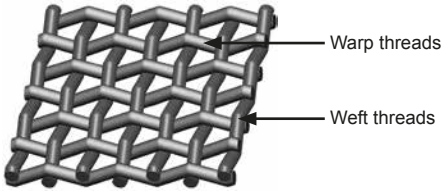
up to 20 bar, filtration rating 25, 50, 100, 200 µm

1. WIRE MESH ELEMENT

1.1 DESCRIPTION

Stainless steel wire mesh filter elements are used in lubrication systems for bearings (e.g. turbine bearings), water filtration, treatment plants for cooling emulsions and as guard filters.

On the W and W/HC filter elements both the warp and weft are equally strong which results in uniform openings in the filter mesh. The pressure drop is lower when filtering with stainless steel wire mesh filter elements. The pleated stainless steel square mesh is supported in single or multiple layers.



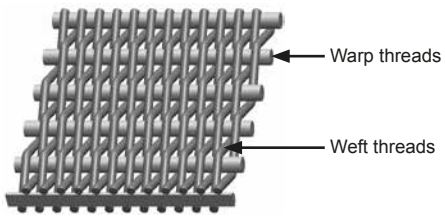
Compared to W/HC elements, W elements have a smaller pleat depth.

The W and W/HC stainless steel wire mesh elements are used in our return line and pressure filters.

Dutch weave

HYDAC offers another wire mesh filter element, the Dutch weave filter element "T". This element is primarily used as a protective filter in mining applications.

On Dutch weaves the warp thread is stronger than the weft thread. The weft wires are laid together as closely as possible and this results in a moderate pressure drop during filtration.



The so-called zero-mesh weaves are only used in pressure filters (Example for order code: 0330 D 050 T).

1.2 GENERAL DATA

Collapse stability	20 bar
Temperature range	-30 °C to +100 °C For sealing material FPM to -10 °C
Flow direction	From outside to inside
Filtration rating	25, 50, 100, 200 µm (others on request)
Bypass cracking pressure	Pressure filter element (**"D"**): Without bypass valve as standard Pressure filter element to DIN 24550 (**"DN"**): Without bypass valve as standard Return line filter element (**"R"**): standard 3 bar (others on request)
Category of filter element	Can be cleaned to extend service life

1.3 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG can only be used with Viton seals
- Fire-resistant fluids HFA, HFB, HFC and HFD as well as operating fluids with a high water content on request

1.4 CLEANING

Stainless steel wire mesh elements can be cleaned after use. However only a certain level (percentage) of cleaning is achievable.

In order to achieve the best possible result, the elements should be cleaned using specialist equipment.

The cleaning effect cannot however be predicted. It depends greatly on various conditions

- Filtration rating:
  The finer the filter material, the worse the cleaning level
- Operating pressure:
  The higher the operating pressure, the more firmly the contamination particles become embedded in the filter material
- Type of particle:
  For example, if the contamination consists mainly of fibres, the level of cleaning is worse than if it consists of cube-type particles.

  In addition it must be noted that with each cleaning process, it is only possible to restore approx. 80-90% of the initial filter area each time, i.e. after 4-5 cleaning cycles, the result might not make economic sense (cleaning costs versus service life).

  Further information on cleaning is provided in the operating manual which is available on request.

2. MODEL CODE

2.1 MODEL CODE FOR STANDARD PRESSURE FILTER ELEMENTS

(Can be used in the following filters: LPF, LF, LFF, MDF, DF, DFF, DFFX, DFDK)

0660 D 025 W/HC /-V

Size

W: 0030, 0060, 0110, 0140, 0160, 0240, 0280, 0330, 0500, 0660, 0990, 1320, 1500

W/HC: 0060, 0110, 0140, 0160, 0240, 0260, 0280, 0330, 0500, 0660, 0990, 1320

Type

D Pressure filter element

Filtration rating in µm

025, 050, 100, 200

Filter material of element

W, W/HC

Supplementary details

V FPM (Viton) seal

W suitable for oil-water emulsions (HFA, HFC)

2.2 MODEL CODE FOR PRESSURE FILTER ELEMENTS TO DIN 24550

(Can be used in the following filters: FLN, LFN, LFNF, DFN, DFNF, FLND, FMND)

0100 DN 025 W/HC /-V

Size

W: 0040, 0063, 0100 (only for FLND and FMND)

W/HC: 0040, 0063, 0100, 0160, 0250, 0400

Type

DN Pressure filter element to DIN 24550

Filtration rating in µm

025, 050, 100, 200

Filter material of element

W, W/HC

Supplementary details

V FPM (Viton) seal

W suitable for oil-water emulsions (HFA, HFC)

2.3 MODEL CODE FOR STANDARD RETURN LINE FILTER ELEMENTS

(Can be used in the following filters: RFM, RF, RFD, RFL, RFLD, NF, NFD)

0660 R 010 W/HC /-V

Size

0030, 0060, 0075, 0090, 0110, 0150, 0160, 0165, 0185, 0195, 0210, 0240, 0270, 0280, 0330, 0450, 0500, 0580, 0660, 0750, 0850, 0950, 1300, 1700, 2600, 2700

Type

R Return line filter element

Filtration rating in µm

025, 050, 100, 200

Filter material of element

W/HC Collapse stability up to 20 bar

Supplementary details

KB without bypass valve

V FKM (Viton) seal

W suitable for oil-water emulsions (HFA, HFC)

3. FILTER CALCULATION / SIZING

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

$\Delta p_{total} = \Delta p_{housing} + \Delta p_{element}$

$\Delta p_{housing}$ = see housing curve in the relevant filter brochure

$$\Delta p_{element} = Q \cdot \frac{SK^*}{1000} \cdot \frac{viscosity}{30}$$

(*see point 4.1)

4. ELEMENT CHARACTERISTICS

4.1 GRADIENT COEFFICIENTS FOR FILTER ELEMENTS

The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

Details for 25, 50, 100, 200 µm

Pressure filter element "D"...		
Size	W	W/HC
0030	3.030	-
0060	0.757	0.757
0110	0.413	0.413
0140	0.324	0.324
0160	0.284	0.284
0240	0.189	0.189
0260	0.131	0.131
0280	0.089	0.089
0330	0.138	0.138
0500	0.091	0.091
0660	0.069	0.069
0990	0.046	0.046
1320	0.035	0.035
1500	0.020	-

Pressure filter element "DN"...		
Size	W	W/HC
0040	0.602	0.727
0063	0.374	0.416
0100	0.232	0.251
0160	-	0.127
0250	-	0.080
0400	-	0.046

Return line filter element "R"...	
Size	W/HC
0030	1.212
0060	0.612
0075	0.362
0090	0.312
0110	0.30
0150	0.185
0160	0.193
0165	0.199
0185	0.907
0195	0.668
0210	0.068
0240	0.123
0270	0.044
0280	0.060
0330	0.195
0450	0.165
0500	0.128
0580	0.065
0660	0.067
0750	0.055
0850	0.052
0950	0.048
1300	0.034
1700	0.025
2600	0.017
2700	0.020

4.2 FILTRATION AREA [CM²]

Pressure filter element "D"...		
Size	W	W/HC
0030	256	-
0060	330	418
0110	672	910
0140	884	1200
0160	857	1144
0240	1348	1911
0280	2862	4264
0330	1795	3133
0500	2891	5107
0660	3795	6958
0990	5431	10091
1320	7378	13916
1500	12966	-

Pressure filter element "DN"...		
Size	W	W/HC
0040	415	427
0063	743	745
0100	1234	1234
0160	-	2439
0250	-	3867
0400	-	6726

Return line filter element "R"...	
Size	W/HC
0030	256
0060	507
0075	857
0090	994
0110	1034
0150	1674
0160	1607
0165	1556
0185	2113
0195	2870
0210	4556
0240	2527
0270	7042
0280	5188
0330	3695
0450	4413
0500	5651
0580	11203
0660	8232
0750	13217
0850	10599
0950	11521
1300	16099
1700	21730
2600	32847
2700	28328

For information on bypass valve curves, please see Filter Element (Quick Selection) brochure no.: E 7.221../..

NOTES

NOTE

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Subject to technical modifications.

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Metal Fibre Filter Elements V

up to 210 bar, filtration rating 3, 5, 10, 20 µm

1. METAL FIBRE ELEMENT

1.1 DESCRIPTION

Metal fibre filter elements are used primarily as protective filters in highly dynamic applications.

The filter element is constructed from randomly laid stainless steel wires. This stainless steel wire meshpack which is pleated, produces a low pressure drop and is suitable for all operating fluids.

The "V" metal fibre elements are used in our return line and pressure filters.

Additional metal fibre version "VB"
An additional metal fibre filter element offered by HYDAC is the "VB" element. This element is used primarily in test rig systems for test cycles where temperatures exceed 100°C and as working filters in highly dynamic applications. VB filter elements are used mainly in HYDAC pressure filters. (Order code example: 0110 D 005 VB).

1.3 GENERAL DATA

Collapse stability	210 bar
Temperature range	-30 °C to +100 °C For sealing material FPM to -10 °C
Flow direction	From outside to inside
Filtration rating	3, 5, 10, 20 µm (others on request)
Bypass cracking pressure	Pressure filter element (**"D"**): Without bypass valve as standard Return line filter element (**"R"**): standard 3 bar (others on request)
Category of filter element	Can be cleaned to extend service life

1.3 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant fluids HFA, HFB, HFC and HFD
- Operating fluids with high water content (>50% water content) on request

1.4 CLEANING

Stainless steel wire mesh elements can be cleaned after use. However only a certain level (percentage) of cleaning is achievable.

In order to achieve the best possible result, the elements should be cleaned using specialist equipment.

The cleaning effect cannot however be predicted. It depends greatly on various conditions

- Filtration rating:
  The finer the filter material, the worse the cleaning level
- Operating pressure:
  The higher the operating pressure, the more firmly the contamination particles become embedded in the filter material
- Type of particle:
  For example, if the contamination consists mainly of fibres, the level of cleaning is worse than if it consists of cube-type particles.

  In addition it must be noted that with each cleaning process, it is only possible to restore approx. 80-90% of the initial filter area each time, i.e. after 4-5 cleaning cycles, the result might not make economic sense (cleaning costs versus service life).

  Further information on cleaning is provided in the operating manual which is available on request.

2. MODEL CODE

2.1 MODEL CODE FOR STANDARD PRESSURE FILTER ELEMENTS

(Can be used in the following filters: LF, LFF, MDF, DF, DFF, DFFX, DFDK, DF…M P, DF…M A, DF…Q E, DF…MHA, DF…MHE, DFZ, DFP, DFPF)

0660 D 010 V /-V

Size
0030, 0060, 0110, 0140, 0160, 0240, 0280, 0330, 0500, 0660, 0990, 1320, 1500

Type
D Pressure filter element

Filtration rating in µm
003, 005, 010, 020

Filter material of element
V

Supplementary details
V FPM (Viton) seal

2.2 MODEL CODE FOR STANDARD RETURN LINE FILTER ELEMENTS

(Can be used in the following filters: RF, RFD, RFL, RFLD, NF, NFD)

0660 R 010 V /-V

Size
0030, 0060, 0110, 0160, 0240, 0280, 0330, 0450, 0500, 0580, 0660, 0750, 0850, 0950, 1300, 1700, 2600, 2700

Type
R Return line filter element

Filtration rating in µm
003, 005, 010, 020

Filter material of element
V

Supplementary details
KB without bypass valve
V FKM (Viton) seal

Others on request.

3. FILTER CALCULATION / SIZING

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

$\Delta p_{total} = \Delta p_{housing} + \Delta p_{element}$

$\Delta p_{housing}$ = see housing curve in the relevant filter brochure

$\Delta p_{element} = Q \cdot \frac{SK^*}{1000} \cdot \frac{viscosity}{30}$

(*see Point 4.1)

4. ELEMENT CHARACTERISTICS

4.1 GRADIENT COEFFICIENTS FOR FILTER ELEMENTS

The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

Pressure filter element "D"...V				
Size	3 µm	5 µm	10 µm	20 µm
0030	18.4	13.5	7.5	3.6
0060	16.0	9.3	5.4	3.3
0110	8.2	5.6	3.3	2.2
0140	5.8	4.8	3.1	2.3
0160	4.6	3.2	2.3	1.4
0240	3.1	2.5	1.7	1.1
0280	2.3	1.7	1.2	0.8
0330	2.2	1.8	1.2	0.8
0500	1.5	1.2	0.8	0.5
0660	1.1	0.9	0.6	0.4
0990	0.8	0.6	0.4	0.3
1320	0.6	0.5	0.3	0.2
1500	0.3	0.2	0.2	0.1

Pressure filter element "R"...V				
Size	3 µm	5 µm	10 µm	20 µm
0030	19.4	14.2	7.9	3.8
0060	15.9	9.3	5.4	3.3
0110	7.6	5.1	3.0	2.0
0160	4.9	3.5	2.4	1.5
0240	3.2	2.6	1.7	1.2
0280	1.4	1.1	0.7	0.5
0330	2.1	1.7	1.1	0.8
0450	1.7	1.3	0.9	0.6
0500	1.5	1.2	0.8	0.5
0580	0.7	0.5	0.3	0.3
0660	1.0	0.8	0.6	0.4
0750	0.6	0.5	0.3	0.2
0850	0.8	0.6	0.4	0.3
0950	0.7	0.6	0.4	0.2
1300	0.5	0.4	0.3	0.2
1700	0.4	0.3	0.2	0.1
2600	0.3	0.2	0.1	0.1
2700	0.2	0.1	0.1	0.1

4.2 FILTRATION AREA [CM²]

Pressure filter element "D"...	
Size	V
0030	268
0060	318
0110	648
0140	852
0160	1082
0240	1702
0280	3615
0330	2260
0500	3640
0660	4770
0990	4735
1320	6454
1500	13294

Pressure filter element "R"	
Size	V
0030	221
0060	372
0110	758
0160	1071
0240	1685
0280	3578
0330	2081
0450	2652
0500	3182
0580	6732
0660	4659
0750	7956
0850	5999
0950	6813
1300	9520
1700	12297
2600	19424
2700	31175

For information on bypass valve curves, please see Filter Element (Quick Selection) brochure no.: E 7.221../..

NOTE

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Paper Filter Elements P/HC

up to 10 bar, filtration rating 10, 20 µm

1. PAPER ELEMENT

1.1 DESCRIPTION

Paper filter elements are usually for applications requiring low levels of filtration. Typical applications are, for example, waste compactors for the filtration of lubrication oil or high-viscosity oils > ISO VG 100.

The filter element is constructed from randomly laid organic fibres that are stiffened with a binder.

Compared to P/HC elements, P elements have a smaller pleat depth.

"P/HC" paper elements are used in our return line filters.

Additional paper version
For low differential pressure stability (usually 2.5 to 3 bar) and for use as fuel and engine filters, randomly laid organic fibres are utilized, and stiffened using a phenolic resin as the binder.
HYDAC uses this material primarily in filler/breathers (e.g. BF, ELF: 0005 L 003 P), suction filters (e.g. SF, SFM: 0160 RS 010 P) as well as in spin-on cartridges (e.g. MF, MFD: 0160 MA 010 P). The pleated design provides a large filter surface at low cost.

For further information please see the relevant filter brochures.

1.2 GENERAL DATA

Collapse stability	10 bar
Temperature range	-30 °C to +100 °C For sealing material FPM to -10 °C
Flow direction	From outside to inside
Filtration rating	10, 20 µm (others on request)
Bypass cracking pressure	Return line filter element (**"R"**): standard 3 bar (others on request)
Category of filter element	Single use element

1.3 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant fluids HFA, HFB, HFC and HFD
- Operating fluids with high water content (>50% water content) on request

2. MODEL CODE

2.1 MODEL CODE FOR STANDARD RETURN LINE FILTER ELEMENTS

(Can be used in the following filters: RFM, RF, RFD, RFL, RFLD, NF, NFD)

0660 R 010 P/HC /-V

Size
0030, 060, 075, 090, 0110, 0150, 0160, 0165, 0185, 0240, 0330, 0500, 0660, 0850, 0950, 1300, 1700, 2600

Type
R Return line filter element

Filtration rating in µm
010, 020

Filter material of element
P/HC

Supplementary details
V FKM (Viton) seal
KB without bypass valve

3. FILTER CALCULATION / SIZING

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

$\Delta p_{total} = \Delta p_{housing} + \Delta p_{element}$

$\Delta p_{housing}$ = see housing curve in the relevant filter brochure

$$\Delta p_{element} = Q \cdot \frac{SK^*}{1000} \cdot \frac{viscosity}{30}$$

(*see point 4.1)

4. ELEMENT CHARACTERISTICS

4.1 GRADIENT COEFFICIENTS FOR FILTER ELEMENTS

The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

Pressure filter element "R"...P/HC		
Size	10 µm	20 µm
0030	3.30	1.67
0060	1.67	0.83
0075	1.29	0.65
0090	1.05	0.53
0110	0.91	0.46
0150	0.73	0.31
0160	0.63	0.31
0165	0.61	0.30
0185	0.52	0.30
0195	0.33	0.16
0210	0.32	0.19
0240	0.42	0.21
0270	0.17	0.07
0280	0.20	0.10
0330	0.30	0.15
0450	0.25	0.13
0500	0.20	0.10
0580	0.10	0.05
0660	0.15	0.08
0750	0.08	0.04
0850	0.12	0.06
0950	0.11	0.05
1300	0.08	0.04
1700	0.06	0.03
2600	0.04	0.02
2700	0.05	0.02

4.2 FILTRATION AREA [CM²]

Pressure filter element "R"...P/HC	
Size	
0030	283
0060	572
0075	1055
0090	1121
0110	1166
0150	1897
0160	1978
0165	1915
0185	2398
0195	3533
0210	4226
0240	3110
0270	8063
0280	6385
0330	4230
0450	5053
0500	6470
0580	12826
0660	8722
0750	15133
0850	11230
0950	15221
1300	21269
1700	23020
2600	43394
2700	36157

For information on bypass valve curves, please see Filter Element (Quick Selection) brochure no.: E 7.221../..

NOTE

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Aquamicron®- Filter Elements AM

up to 10 bar, filtration rating 40 µm

1. AQUAMICRON® ELEMENT

1.1 DESCRIPTION

The presence of water in hydraulic media is a frequent cause of failures, for example, blinding of very fine filters or jamming of valves, and these problems are often incorrectly attributed to excessive levels of solid contamination. In addition, the formation of rust and the reduction in lubricity on bearings and slideways can result in significant deterioration in system function. In other words, water is itself a serious "contaminant" of the hydraulic medium.

Since the conventional methods of dewatering are in most cases uneconomical in relation to the purchase price of the system, HYDAC Aquamicron® technology provides an economically acceptable, yet effective method of separating water from hydraulic media.

Aquamicron® filter elements are specifically designed to separate water from mineral oils, HFD-R oils and biodegradable oils. They are only available in the dimensions to suit HYDAC return line filter elements, size 330 and above. They can therefore be installed in all HYDAC filter housings, size 330 and above, which are equipped with return line filter elements.

The increasing pressure drop across the filter element which is becoming "saturated" with water indicates, with the aid of standard clogging indicators, that it is time to change the element.

As an added bonus when using the Aquamicron® technology, solid contamination is also filtered out of the hydraulic medium. This means the Aquamicron® element also doubles as a safety filter. The filtration rating is 40 µm absolute. To guarantee maximum efficiency it is recommended that they are installed offline.

1.2 GENERAL DATA

Max. permitted operating pressure	25 bar
Max. permitted Δp across element	10 bar
Temperature range	0 °C to +100 °C
Flow direction	From outside to inside
Filtration rating	40 µm
Bypass cracking pressure	Return line filter element ("**R**"): standard 3 bar (others on request)
Category of filter element	Single use element

1.3 PRINCIPLES OF AQUAMICRON® TECHNOLOGY

The separation of water from hydraulic fluids with the aid of the superabsorber embedded in the filter material is based on a physico-chemical reaction. The superabsorber reacts with the water present in the medium and expands to form a gel. This reaction is not reversible, even under increased pressure. The Aquamicron® technology is capable of absorbing circulating water, be it emulsified or free. These filter elements cannot remove dissolved water from the system, i.e. water below the saturation level of the hydraulic medium.

1.4 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant pressure fluid HFD

The following principles apply to Aquamicron® technology:

High water content	→	High absorption rate	
Low water content	→	Low absorption rate	
Unsaturated filter element	→	High absorption rate	
Saturated filter element	→	Low absorption rate	
Hydraulic filter area load (l/min/cm²)	↘	Absorption rate Water absorption capacity Residual water content	↗ ↗ ↘
Static pressure	↘	Absorption rate Water absorption capacity Residual water content	= = ↘
Pressure and flow rate fluctuations present		Absorption rate Water absorption capacity Residual water content	↘ ↘ ↗
Dispersant/detergent additives present		Absorption rate Water absorption capacity Residual water content	↘ = ↗

2. MODEL CODE

(also order example)

0660 R 040 AM /-V

Size
0330, 0500, 0660, 0750, 0850, 0950, 1300, 1700, 2600, 2700

Type
R Return line filter element

Filtration rating in µm
040

Filter material of element
AM Aquamicron®

Supplementary details
V FPM (Viton) seal

3. DETERMINATION OF THE WATER CONTENT G_W PRESENT IN THE SYSTEM

Two methods can be employed to determine the water content G_W present in the system:

- Hydrogen gas method
- Karl Fischer method to DIN 51777

The hydrogen gas method can be carried out using portable test equipment, e. g. the HYDAC Water Test Kit WTK, however, reading accuracy at water contents below 500 ppm is limited.

The Karl Fischer method on the other hand can only be conducted in the laboratory and is offered by HYDAC Filtertechnik as a laboratory service.

The water content GW is usually given in ppm (parts per million) or in percent (100 ppm corresponds to 0.01%).

3.1 DETERMINATION OF THE WATER RETENTION CAPACITY C_W (CM³)

$q = Q/A$
(recommendation: $q_{max} \leq 0.04$ l/min cm²)

q = specific filtration area load of a filter element in l/min cm²

Q = flow rate in l/min

A = filtration area in cm² (see Point 4.2)

$C_W = K_W \times A$ (cm³)

C_W = Water retention capacity of a filter element in cm³

K_W = specific water retention capacity dependent on the specific filtration area load in q (10^{-3} cm³ H_2O/cm²)

A = filtration area in cm² (see Pt. 4.2)

3.2 When sizing elements with the water absorbing filter material Aquamicron, we recommend using the table below:

Size	Recommended filter flow rate [l/min]	Water absorption capacity [cm³] at Δp = 2.5 bar and a viscosity of 30 mm²/s
330	13 ideal 100 maximum	260 180
500	19 ideal 155 maximum	400 280
660	28 ideal 255 maximum	570 400
750	48 ideal 390 maximum	982 691
850	35 ideal 286 maximum	730 520
950	39 ideal 314 maximum	800 570
1300	54 ideal 437 maximum	1120 790
1700	73 ideal 599 maximum	1505 1059
2600	109 ideal 870 maximum	2230 1570
2700	98 ideal 803 maximum	2020 1422

3.3 CALCULATION OF THE WATER QUANTITY M_W TO BE ABSORBED BY THE FILTER ELEMENT

$m_w = \Delta G_w \times 10^{-3} \times V_T$ (cm³)

m_w = water quantity to be absorbed by filter element in cm³

ΔG_w = Difference between the initial and required final water content in ppm

Please note:
It is impossible to achieve a final water content which is below the saturation level of the hydraulic medium!

V_T = Tank volume in l x 100

4. ELEMENT CHARACTERISTICS

4.1 GRADIENT COEFFICIENTS FOR FILTER ELEMENTS

The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

Size	40 µm
330	2.10
500	1.38
660	0.93
750	0.55
850	0.72
950	0.66
1300	0.47
1700	0.36
2600	0.23
2700	0.26

4.2 FILTRATION AREA

Size	cm²
330	2785
500	4259
660	6174
750	9961
850	7949
950	8667
1300	12111
1700	15271
2600	20499
2700	20499

For information on bypass valve curves, please see Filter Element (Quick Selection) brochure no.: E 7.221../..

NOTE

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Betamicron®/Aquamicron®-Filter Elements BN4AM

up to 10 bar, filtration rating 3, 10 µm

1. BETAMICRON®/ AQUAMICRON® ELEMENT

1.1 DESCRIPTION

The presence of water in hydraulic media is a frequent cause of failures, for example, blinding of very fine filters or jamming of valves and these problems are often incorrectly attributed to excessive levels of solid contamination. In addition, the formation of rust and the reduction in lubricity on bearings and slideways can result in significant deterioration in system function.
In other words, in addition to solid particles, water is an equally serious contaminant of the hydraulic medium. Since the conventional methods of dewatering are in most cases uneconomical in relation to the purchase price of the system, HYDAC BN4AM technology provides an economically acceptable, yet effective method of separating water from hydraulic media which at the same time achieves absolute filtration of solid particles.

General
BN4AM filter elements are specifically designed to separate water, and to achieve absolute filtration of solid particles, from mineral oils, HFD-R oils and biodegradable oils.
A superabsorber reacts with the water present in the medium and expands to form a gel. This reaction is not reversible, even under increased pressure. These filter elements cannot remove dissolved water from the system, i.e. water below the saturation level of the hydraulic medium. Solid particles are also removed by the Betamicron® filter element meshpack.

1.2 GENERAL DATA

Max. permitted operating pressure	10 bar
Max. permitted Δp across element	10 bar
Temperature range	0 °C to +100 °C
Flow direction	From outside to inside
Filtration rating	3, 10 µm
Bypass cracking pressure	Return line filter element ("**R**"): standard 3 bar (others on request)
Category of filter element	Single use element

1.3 PRINCIPLES OF THE BN4AM COMBINED FILTER ELEMENTS

- BN4AM filter element based on inorganic and water-absorbent fibres
- Exemplary absorption of water from mineral oils with the aid of a superabsorber embedded in the filter material
- Excellent absorption of finest particles over a wide differential pressure range (3, 10 µm absolute)
- Exemplary β-stability over wide differential pressure ranges
- Extremely high contamination retention capacity
- Good chemical resistence through the use of epoxy resins for impregnation and bonding
- Element protection due to high burst pressure stability (e. g. during cold starts and dynamic differential pressure surges)

1.4 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant fluids HFA, HFB, HFC and HFD
- Operating fluids with high water content (>50% water content) on request

The following principles apply to water separation:

High water content	→	High absorption rate	
Low water content	→	Low absorption rate	
Unsaturated filter element	→	High absorption rate	
Saturated filter element	→	Low absorption rate	
Hydraulic filter area load (l/min/cm²)	↘	Absorption rate Water absorption capacity Residual water content	↗ ↗ ↘
Static pressure	↘	Absorption rate Water absorption capacity Residual water content	= = ↘
Pressure and flow rate fluctuations present		Absorption rate Water absorption capacity Residual water content	↘ ↘ ↗
Dispersant/detergent additives present		Absorption rate Water absorption capacity Residual water content	↘ = ↗

2. MODEL CODE

(also order example)

0660 R 010 BN4AM /-V

Size
0330, 0500, 0660, 0750, 0850, 0950, 1300, 1700, 2600, 2700

Type
R Return line filter element

Filtration rating in µm
003, 010

Filter material of element
BN4AM Betamicron®/Aquamicron®

Supplementary details
V FPM (Viton) seal

3. DETERMINATION OF THE WATER CONTENT G_W PRESENT IN THE SYSTEM

Two methods can be employed to determine the water content G_W present in the system:

- Hydrogen gas method
- Karl Fischer method to DIN 51777

The hydrogen gas method can be carried out using portable test equipment, e. g. the HYDAC Water Test Kit WTK, however, reading accuracy at water contents below 500 ppm is limited.

The Karl Fischer method on the other hand can only be conducted in the laboratory and is offered by HYDAC Filtertechnik as a laboratory service.

The water content G_W is usually given in ppm (parts per million) or in percent (100 ppm corresponds to 0.01%).

3.1 WATER ABSORPTION - QUICK SIZING TABLE

Size	Recommended filter flow rate [l/min]	Water absorption capacity [cm³] at Δp = 2.5 bar and a viscosity of 30 mm²/s
330	13	180
500	19	280
660	28	400
750	48	691
850	35	520
950	39	570
1300	54	790
1700	73	1059
2600	109	1570
2700	98	1422

4. FILTER CALCULATION / SIZING

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

$\Delta p_{total} = \Delta p_{housing} + \Delta p_{element}$

$\Delta p_{housing}$ = see housing curve in the relevant filter brochure

$$\Delta p_{element} = Q \cdot \frac{SK^*}{1000} \cdot \frac{viscosity}{30}$$

(*see Point 5.1)

5. ELEMENT CHARACTERISTICS

5.1 GRADIENT COEFFICIENTS FOR FILTER ELEMENTS

The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

Size	3 µm	10 µm
330	8.7	3.0
500	5.7	2.0
660	3.5	1.2
750	2.3	0.8
850	2.8	0.9
950	2.4	0.8
1300	1.6	0.6
1700	1.3	0.5
2600	0.8	0.3
2700	1.0	0.3

5.2 CONTAMINATION RETENTION CAPACITY IN G

The contamination retention and particle filtration performance of an element are established in the multipass test to ISO 16889. This procedure with its precisely defined test conditions and a standard test dust (ISO MTD) enables the performance data of different elements to be compared.

Size	3 µm	10 µm
330	55.0	60.0
500	83.9	93.9
660	120.0	140.0
750	209.3	234.5
850	156.5	175.3
950	170.0	190.0
1300	240.0	270.0
1700	320.8	359.4
2600	490.0	540.0
2700	430.7	482.5

For information on bypass valve curves, please see Filter Element (Quick Selection) brochure no.: E 7.221../..

NOTE

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For applications or operating conditions not described, please contact the relevant technical department.
Subject to technical modifications.

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Glass fibre filter elements ULP/UHC

with or without pre-filter
flow direction from in to out
up to 6 bar, filtration rating 5, 10, 20, 25 µm

1. GLASS FIBRE ELEMENT

1.1 DESCRIPTION

The 4-layered media structure of the ULP elements were developed on the basis of RT-Filtertechnik's many years of experience in mobile applications. The structure has a very low Δp/Q performance curve.

The 5-layered media structure of the UMC elements were developed on the basis of RT-Filtertechnik's many years of experience in mobile applications. The structure has a very high retention rate across the elements' entire service life. It is also highly stable in the event of flow rate fluctuations, which are very common in mobile applications.

1.2 GENERAL DATA

Collapse stability	6 bar
Filter element	ULP = Glass fibre UHC = Glass fibre with pre-filter
Temperature range	-30 °C to +100 °C For sealing material FPM to -10 °C
Flow direction	From inside to outside
Filtration rating	5, 10, 20, 25 µm
Bypass cracking pressure	The bypass valve function is realised in the filter or in the element spigot. The cracking pressure is 3 bar as standard (others on request)
Category of filter element	Single use element

1.3 HELIOS PLEAT GEOMETRY: ΔP OPTIMISED FILTRATION/OPTIONAL

Using high-quality folding machines and pleat geometries, high-quality filter elements can always be significantly optimised technologically. In addition, the use of these folding technologies enables the improvement of low-weight, flow-optimised filtration materials in terms of their service life and pulsation stability. The other way round, pulsation resistant filter media of higher weight can be produced with significantly reduced differential pressure difference compared to filter elements folded in the conventional manner.

1.4 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant fluids FHA, HFB, HFC and HFD
- Operating fluids with high water content (>50% water content) on request

2. MODEL CODE

2.1 MODEL CODE FOR STANDARD PRESSURE FILTER ELEMENTS

(Can be used in the following filters: LFR, LPFR, MDFR)

0080 D 010 ULP /-V

Size
0020, 0045, 0080, 0150, 0250

Type
D Pressure filter element

Filtration rating in µm
005, 010, 025

Filter material of element
ULP Collapse stability up to 6 bar

Supplementary details
V FPM (Viton) seal

2.2 MODEL CODE FOR RETURN LINE FILTER ELEMENTS

(Can be used in the following filters: RMER, RPER, RKMR)

0400 R 010 ULP /-V

Size
0170, 0230, 0300, 0310, 0400, 0500, 0600, 0800, 1200

Type
R Return line filter element

Filtration rating in µm
005, 010, 025

Filter material of element
ULP Collapse stability up to 6 bar

Supplementary details
V FPM (Viton) seal

2.3 MODEL CODE FOR RETURN LINE FILTER ELEMENTS RMTR

(Can be used in the following filters: RMTR)

0600 RMT 010 ULP /-V

Size
0600, 0800, 1200

Type
R Return line filter element

Filtration rating in µm
005, 010, 025

Filter material of element
ULP Collapse stability up to 6 bar

Supplementary details
V FPM (Viton) seal

2.4 MODEL CODE FOR STANDARD PRESSURE FILTER ELEMENTS WITH PRE-FILTER

(Can be used in the following filters: LFR, LPFR, MDFR)

0080 D 010 UHC /-V

Size
0020, 0045, 0080, 0150, 0250

Type
D Pressure filter element

Filtration rating in µm
005, 010, 020

Filter material of element
UHC Collapse stability up to 6 bar

Supplementary details
V FPM (Viton) seal

2.5 MODEL CODE FOR RETURN LINE FILTER ELEMENTS WITH PRE-FILTER

(Can be used in the following filters: RMER, RPER, RKMR, RFLR)

0400 R 010 UHC /-V

Size
0170, 0230, 0300, 0310, 0400, 0500, 0600, 0800, 1000, 1200

Type
R Return line filter element

Filtration rating in µm
005, 010, 020

Filter material of element
UHC Collapse stability up to 6 bar

Supplementary details
V FPM (Viton) seal

2.6 MODEL CODE FOR RETURN LINE FILTER ELEMENTS RMTR

(Can be used in the following filters: RMTR)

0600 RMT 010 UHC /-V

Size
0600, 0800, 1200

Type
R Return line filter element

Filtration rating in µm
005, 010, 020

Filter material of element
UHC Collapse stability up to 6 bar

Supplementary details
V FPM (Viton) seal

3. FILTER CALCULATION / SIZING

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

$\Delta p_{total} = \Delta p_{housing} + \Delta p_{element}$

$\Delta p_{housing}$ = see housing curve in the relevant filter brochure

$\Delta p_{element} = Q \cdot \frac{SK^*}{1000} \cdot \frac{viscosity}{30}$

(* gradient coefficient see Point 4.1)

4. ELEMENT CHARACTERISTICS

4.1 GRADIENT COEFFICIENTS FOR FILTER ELEMENTS

The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

Pressure filter element "D"...ULP			
Filter size	5 µm	10 µm	25 µm
0020	32.4	17.6	8.0
0045	14.2	7.2	2.9
0080	11.3	5.5	2.2
0150	6.8	3.3	1.3
0250	4.2	2.0	0.8

Return line filter element "R"...ULP			
Filter size	5 µm	10 µm	25 µm
0170	3.23	1.70	0.79
0230	2.39	1.26	0.59
0300	1.79	0.94	0.44
0310	1.79	0.94	0.44
0400	1.37	0.72	0.33
0500	1.25	0.66	0.31
0600	0.50	0.25	0.08
0800	0.40	0.18	0.06
1200	0.24	0.10	0.03

Pressure filter element "D"...UHC			
Filter size	5 µm	10 µm	20 µm
0020	40.8	22.2	10.6
0045	18.0	9.0	4.5
0080	14.2	7.1	3.5
0150	8.6	4.3	2.0
0250	5.3	2.6	1.3

Return line filter element "R"...UHC			
Filter size	5 µm	10 µm	20 µm
0170	3.1	1.86	1.02
0230	2.9	1.38	0.76
0300	2.0	1.02	0.56
0310	2.0	1.02	0.56
0400	1.64	0.78	0.43
0500	1.51	0.72	0.40
0600	0.70	0.35	0.15
0800	0.54	0.26	0.09
1000	0.35	0.15	0.08
1200	0.28	0.13	0.06

Others on request!

4.2 CONTAMINATION RETENTION CAPACITY IN G

The contamination retention and particle filtration performance of an element are established in the multipass test to ISO 16889. This procedure with its precisely defined test conditions and a standard test dust (ISO MTD) enables the performance data of different elements to be compared.

Pressure filter element "D"...ULP			
Filter size	5 µm	10 µm	25 µm
0020	1.5	2.61	2.9
0045	3.4	6.03	6.7
0080	4.2	7.51	8.4
0150	5.3	9.45	10.5
0250	8.5	15.3	17.0

Return line filter element "R"...ULP			
Filter size	5 µm	10 µm	25 µm
0170	12.4	22.3	27.2
0230	17.4	31.3	38.1
0300	31.9	57.4	70.0
0310	27.1	48.8	59.5
0400	36.9	65.2	79.5
0500	43.8	78.9	96.2
0600	85.0	153.0	170.0
0800	115.0	207.0	230.0
1200	170.0	306.0	340.0

Pressure filter element "D"...UHC			
Filter size	5 µm	10 µm	20 µm
0020	4.6	6.9	7.8
0045	10.7	16.1	18.1
0080	13.4	20.0	22.6
0150	16.8	25.2	28.4
0250	27.2	40.8	45.9

Return line filter element "R"...UHC			
Filter size	5 µm	10 µm	20 µm
0170	24.3	36.4	44.4
0230	31.7	47.6	58.1
0300	51.8	77.7	94.8
0310	51.8	77.7	83.3
0400	60.8	91.2	111.3
0500	78.0	117.0	142.7
0600	272.0	408.0	459.0
0800	368.0	552.0	621.0
1000	438.0	658.0	739.0
1200	544.0	816.0	918.0

NOTE

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Wire Mesh Filter Elements WR

Flow direction from in to out
up to 6 bar, filtration rating 25, 40, 60, 100 µm

1. WIRE MESH ELEMENT

1.1 DESCRIPTION

WR filter elements have a wire mesh with a star-shaped pleat and support cylinder with square perforations. They are used for medium to large flow rates in inline filters, return line filters and suction line filters. Filter elements with a metal wire mesh are often used as an inexpensive and reusable solution. Depending on the requirements (filtration rating, pressure, dynamics) vaiours types of mesh are used, such as twill, linen and Dutch weave. Wire mesh filter elements are always surface filters, which means that they become contaminated faster than single use elements. For the regeneration, it must be borne in mind that elements finer than 40 µm can only be cleaned in the ultrasonic bath.

1.2 GENERAL DATA

Collapse stability	6 bar
Temperature range	-30 °C to +100 °C For sealing material FPM to -10 °C
Flow direction	From outside to inside
Filtration rating	25, 40, 60, 100 µm (others on request)
Bypass cracking pressure	The bypass valve function is realised in the filter or in the element spigot. For a pressure filter element ("**D**") or a return line filter element ("**R**") the cracking pressure is 3 bar as standard (others on request) Return line filter element, suction line ("**RS**"): without bypass valve as standard
Category of filter element	Can be cleaned to extend service life

1.3 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant fluids FHA, HFB, HFC and HFD
- Operating fluids with high water content (>50% water content) on request

1.4 CLEANING

Stainless steel wire mesh elements can be cleaned after use. However only a certain level (percentage) of cleaning is achievable.

In order to achieve the best possible result, the elements should be cleaned using specialist equipment.

The cleaning effect cannot however be predicted. It depends greatly on various conditions

- Filtration rating:
  The finer the filter material, the worse the cleaning level
- Operating pressure:
  The higher the operating pressure, the more firmly the contamination particles become embedded in the filter material
- Type of particle:
  For example, if the contamination consists mainly of fibres, the level of cleaning is worse than if it consists of cube-type particles.

In addition it must be noted that with each cleaning process, it is only possible to restore approx. 80-90% of the initial filter area each time, i.e. after 4-5 cleaning cycles, the result might not make economic sense (cleaning costs versus service life).

Further information on cleaning is provided in the operating manual which is available on request.

2. MODEL CODE

2.1 MODEL CODE FOR PRESSURE FILTER ELEMENTS

(Can be used in the following filters: LFR, LPFR, MDFR)

0080 D 040 WR /-V

Size
0020, 0045, 0080, 0150, 0250

Type
D Pressure filter element

Filtration rating in µm
025, 040, 060

Filter material of element
WR Collapse stability up to 6 bar

Supplementary details
V FKM (Viton) seal

2.2 MODEL CODE FOR RETURN LINE FILTER ELEMENTS

(Can be used in the following filters: RMER; RMTR, RPER, RFLR)

0800 R 040 WR /-V

Size
0170, 0230, 0300, 0310, 0400, 0500, 0600, 0800, 1000, 1200

Type
R Return line filter element

Filtration rating in µm
025, 040, 060

Filter material of element
WR Collapse stability up to 6 bar

Supplementary details
V FKM (Viton) seal

2.3 MODEL CODE FOR RETURN LINE FILTER ELEMENTS, SUCTION LINE FILTER

(Can be used in the following filters: SFAR)

0180 RS 100 WR /-V

Size
0100, 0150, 0180, 200, 250

Type
RS Return line filter element, suction line filter

Filtration rating in µm
100

Filter material of element
WR Collapse stability up to 3 bar

Supplementary details
V FKM (Viton) seal

3. FILTER CALCULATION / SIZING

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

$\Delta p_{total} = \Delta p_{housing} + \Delta p_{element}$

$\Delta p_{housing}$ = see housing curve in the relevant filter brochure

$$\Delta p_{element} = Q \cdot \frac{SK^*}{1000} \cdot \frac{\text{viscosity}}{30}$$

(* gradient coefficient see Point 4.1)

4. ELEMENT CHARACTERISTICS

4.1 GRADIENT COEFFICIENTS FOR FILTER ELEMENTS

The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

Details for 60 and 100 µm

Pressure filter element "D"...	
Size	WR
0020	2.0414
0045	0.9020
0080	0.7183
0150	0.4617
0250	0.2810

Return line filter element "R"...	
Size	WR
0170	0.0558
0230	0.0388
0300	0.0287
0310	0.0279
0400	0.0218
0500	0.0113
0600	0.0067
0800	0.0057
1200	0.0036

Return line filter element "RS"...	
Size	WR
0100	0.4299
0150	0.2991
0180	0.2293
0200	0.1994
0250	0.1376

4.2 FILTRATION AREA [CM²]

Pressure filter element "D"...	
Size	WR
0020	190
0045	430
0080	540
0150	840
0250	1380

Return line filter element "R"...	
Size	WR
0170	1720
0230	2320
0300	3110
0310	3200
0400	4100
0500	7900
0600	13600
0800	16000
1200	24700

Return line filter element "RS"...	
Size	WR
0100	1600
0150	2300
0180	3000
0200	3450
0250	5000

NOTES

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RT-PLEAT filter elements

Element flow direction from in to out
up to 10 bar, filtration rating 3, 5, 7, 12 and 20 µm

1. RT PLEAT ELEMENT

1.1 DESCRIPTION

Within the HYDAC Group, a new generation of elements has been developed that enables efficient refitting of Pall housing of the types UR319, UR619, UR209 and UR219: RT-PLEAT.

They are used in pressure filter housing, where they provide fine filtration of hydraulic and lubricating oils.

Further information on Betterfit elements is available from the Betterfit database on our website (www.hydac.com) under Service > Online Tools > Betterfit

1.2 FUNCTION

The pleated structure of the new RT-PLEAT filter elements remains highly stable even under operating conditions such as cold starts or high differential pressures. This guarantees a high level of contamination retention and ensures that the contamination remains in the element, even during pressure pulsations. Furthermore, the entire filter surface is used during the service life of the filter element. This means that pressure losses are minimised.

- Long system life time and reliable component protection due to the high separation capacity
- Long element life times due to the high contamination retention capacity and low pressure loss at the element
- Low operating costs due to the long element changing intervals and the economic element price

1.3 GENERAL DATA

Collapse stability	10 bar
Temperature range	-20 °C to +120 °C
Flow direction	From inside to outside
Filtration rating	3, 5, 7, 12, 20 µm
Seal material	FKM
Bypass cracking pressure	Pressure filter element ("**D**"): Without bypass valve as standard
Category of filter element	Single use element

1.4 STAT-FREE® TECHNOLOGY OPTIONAL

By completely revising the materials used, e.g. through the use of conductive plastics, fully discharge-capable filter elements are the result.

Electrical charging of the filter elements during operation has therefore been reduced to a negligible level. The risks of sudden sparking and the subsequent formation of soot or sludge in the oil are therefore reliably eliminated.

With the new Stat-Free® filter elements, HYDAC has for the first time succeeded in combining excellent electrostatic characteristics with filtration performance. Unprecedented low charge generation in the filter element and in the system fluid is achieved with a new type of filter mesh pack and element design.

1.5 INNOVATIVE OUTER WRAP WITH IMPROVED DIFFUSER EFFECT FOR PRINTING WITH CUSTOMER LOGO

Since the outer wrap can be printed with the customer logo, it also acts as an advertising medium for the OEM and guarantees security of the spares business. At the same time, the user can be certain of obtaining an original spare part. Particular benefit: the logo remains perfectly legible even in the contaminated condition.

1.6 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant fluids HFA, HFB, HFC and HFD
- Operating fluids with high water content (>50% water content) on request

2. MODEL CODE

2.1 MODEL CODE FOR RT-PLEAT PRESSURE FILTER ELEMENTS

1.28.04 D 03 RT-PLEAT /-V

Size

Type
D Pressure filter element

Filtration rating in µm
03, 05, 07, 12, 20

Filter material of element
RT-PLEAT Collapse stability up to 10 bar

Supplementary details
V FKM seal (standard = **must be specified**)
SFREE Stat-Free® element technology

3. FILTER CALCULATION / SIZING

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

$\Delta p_{total} = \Delta p_{housing} + \Delta p_{element}$

$\Delta p_{housing}$ = see housing curve in the relevant filter brochure

$$\Delta p_{element} = Q \cdot \frac{SK^*}{1000} \cdot \frac{viscosity}{30}$$

(*see Point 4.1)

4. ELEMENT CHARACTERISTICS

4.1 GRADIENT COEFFICIENTS FOR FILTER ELEMENTS

The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

Pressure filter element 1.21. ..."D"...RT-PLEAT /-V

Size	3 µm	5 µm	7 µm	12 µm	20 µm
1.21.08	8.90	3.50	3.16	2.61	2.25
1.21.13	5.50	2.17	1.97	1.63	1.40
1.21.20	3.60	1.41	1.27	1.05	0.91
1.21.40	1.80	0.70	0.63	0.53	0.46

Pressure filter element 1.22. ..."D"...RT-PLEAT /-V

Size	3 µm	5 µm	7 µm	12 µm	20 µm
1.22.20	1.00	0.82	0.74	0.67	0.61
1.22.40	0.40	0.41	0.37	0.34	0.30

Pressure filter element 1.27. ..."D"...RT-PLEAT /-V

Size	3 µm	5 µm	7 µm	12 µm	20 µm
1.27.03	65.90	20.40	18.80	16.50	15.18
1.27.07	29.30	9.00	9.86	7.30	8.10

Pressure filter element 1.28. ..."D"...RT-PLEAT /-V

Size	3 µm	5 µm	7 µm	12 µm	20 µm
1.28.04	33.70	11.00	9.90	9.00	8.20
1.28.08	17.20	5.60	5.00	4.60	4.20
1.28.13	10.80	3.50	3.10	2.80	2.50
1.28.20	7.00	2.30	2.10	1.80	1.60

4.2 CONTAMINATION RETENTION CAPACITY IN G

The contamination retention and particle filtration performance of an element are established in the multipass test to ISO 16889. This procedure with its precisely defined test conditions and a standard test dust (ISO MTD) enables the performance data of different elements to be compared.

Pressure filter element 1.21. ..."D"...RT-PLEAT /-V

Size	3 µm	5 µm	7 µm	12 µm	20 µm
1.21.08	41.08	22.63	25.57	47.97	52.77
1.21.13	67.71	37.30	41.00	78.61	86.47
1.21.20	104.52	57.58	63.34	121.35	133.48
1.21.40	208.70	115.04	126.54	242.44	266.68

Pressure filter element 1.22. ..."D"...RT-PLEAT /-V

Size	3 µm	5 µm	7 µm	12 µm	20 µm
1.22.20	455.00	340.29	374.31	504.47	554.92
1.22.40	910.00	680.59	748.65	1008.95	1109.84

Pressure filter element 1.27. ..."D"...RT-PLEAT /-V

Size	3 µm	5 µm	7 µm	12 µm	20 µm
1.27.03	4.90	6.25	6.88	6.06	6.80
1.27.07	11.07	14.13	15.40	13.70	15.10

Pressure filter element 1.28. ..."D"...RT-PLEAT /-V

Size	3 µm	5 µm	7 µm	12 µm	20 µm
1.28.04	9.80	11.70	12.90	12.12	13.33
1.28.08	19.60	23.40	25.74	19.88	21.87
1.28.13	30.63	36.57	40.59	37.88	41.67
1.28.20	40.55	77.13	84.84	59.10	65.05

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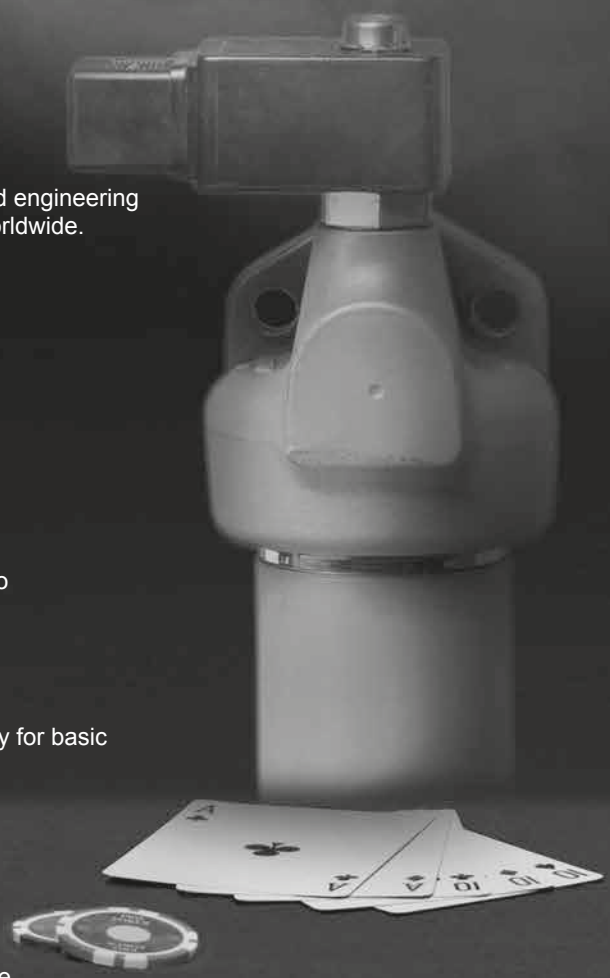
The HYDAC Betterfit Range With our Investment, You Can't Lose.

The HYDAC Betterfit Range: The Royal Flush in Filter Elements.

The Best Combination. Every Time. On Paper and in Practice.

With HYDAC and the HYDAC Betterfit Range you hold all the aces when it comes to conditioning your fluids:



Global Presence.
HYDAC forges close links with its customers by providing engineering advice and fluid engineering in over 45 international subsidiaries and over 500 distributors and service partners worldwide.

Specialist expertise.
HYDAC has developed expertise in the research, development and production of filter housings, filter systems and filter elements over many decades.

Industry competence.
HYDAC industry competence forged through close cooperation with the most exacting international clients in almost all industries in the world.

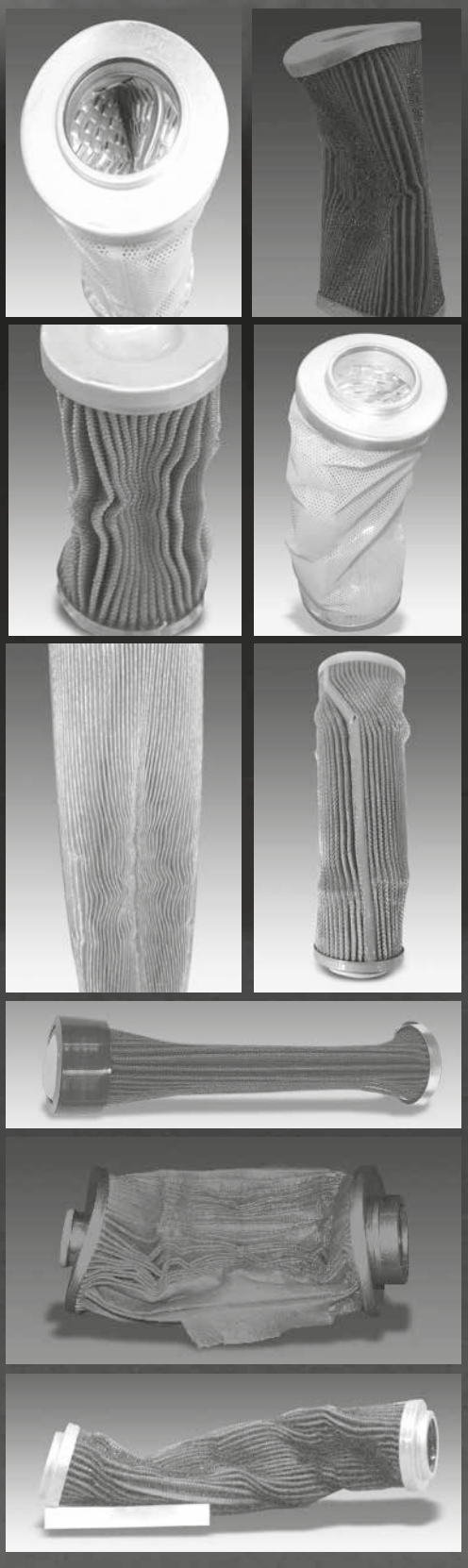
Complete range.
HYDAC filter elements provide a comprehensive range to suit all applications and also almost all competitor filters. Our customer-focused service package is included, ranging from specialist advice to availability at short notice.

Quality from the ground up.
In the HYDAC Fluid Care Center, which is our own state-of-the-art industrial laboratory for basic research, functionality and quality testing as well as application-specific development, we explore the most efficient fluid technology solutions.
This results in high-end quality filters and elements with maximum efficiency.

Strongest link in the chain.
As a system partner with wide-ranging industrial experience, HYDAC does its utmost to ensure each filter element is one of the most efficient links in the functionality chain of fluid technology systems. HYDAC therefore guarantees the greatest possible component protection for the longest possible service life.

Better is better than good enough.
The HYDAC Betterfit range combines the best ideas and the best in fluid engineering – filter elements which stand up to every comparison and every challenge.

Don't fall for a cheap bluff.



Using elements of inferior quality can have drastic consequences:

- **Poorer cleanliness classes in the customer's system**
- **Inadequate component protection**
- **Shorter filter lifetimes**
- **Threat to operating reliability and even risk of system failures**
- **Restricted system availability**
- **Increased Life Cycle Cost for the customer**

Never trust a poker face.
Don't let yourself be taken in!
Trust HYDAC,
Your system will thank you for it!

The shocking evidence of these no-name elements which have collapsed shows exactly what happens to cheap filter elements after just a few hours operation. The often unseen damage caused to control components and systems can sometimes have the effect of paralysing whole production systems.

By contrast, with HYDAC filter elements and their rigorous and systematic quality, you will have the winning hand for every application.

B-E-T-T-E-R-F-I-T
Better for quality and efficiency.

Here you are guaranteed to find the right element.

The HYDAC Betterfit range covers a wide variety of replacement elements in the dimensions used by competitors, particularly all well-known filter element manufacturers.
Our Betterfit elements are made predominantly from the tried-and-tested Betamicron4 element technology (other materials, such as synthetic fibre or wire mesh are also available).

Put your money on genuine quality equipment and opt for Hydac replacement elements – your system will thank you for it!

By using our Betterfit elements you will benefit from the whole Hydac service package – from oil sampling to oil analysis.
This also includes identifying the source of faults and designing filtration concepts.
Hydac supports you at every stage and in all aspects of fluid service.

Just as our motto says "With our investment, you can't lose" we will take care of your system, leaving you to concentrate fully on your core competence.

Steady expansion of the Betterfit range.

Since launching the Betterfit range the number of replacement filter elements has increased daily.
We respond to your request.
If the required element is not yet available, we will endeavour to add it to the Betterfit product range as quickly as possible once we have examined the design.
Today there are approximately 23,000 replacement elements in the Betterfit line of elements and the number is growing day by day.

Betamicron®4

Decades of experience and ongoing further development in the field of hydraulic and lubrication oil filtration have given HYDAC the technological edge in top quality filter element technology.

The high performance Betamicron®4 is the predominant material used in the **Betterfit element product range.**
This innovative glass fibre media will convince you with its exceptionally high contamination retention capacities, excellent filtration efficiency and optimized $\Delta p/Q$ characteristics.

Particular customer benefits of HYDAC filter elements:

- **Energy cost savings**
  thanks to particularly low pressure drops
- **High quality component protection and long system life**
  due to excellent filtration efficiency
- Long service life
  and low operating costs
  due to particularly high contamination retention capacities
- High degree of operating reliability
  because of compact and robust construction

Efficiency

Global and yet local.

45 overseas companies and over 500 sales and service partners provide a worldwide presence on the ground.
We provide efficient support on demand.

Total cleanliness

And your system will thank you for it.

Technical support

Skilled advisors in the regional offices and overseas subsidiaries.

One for all

All from one supplier.

HYDAC can supply you with the whole spectrum of products including outstanding Fluid Service.
Specifically in the area of filtration, we can supply you with every filter element used in your production processes from our Betterfit range - just tell us your filter cartridge requirement and you will receive the complete package from one supplier.
In short: we take care of your filtration needs whilst you concentrate fully on your core competence.

Cleanliness

System cleanliness assured by professionalism and quality.

Fluid management

With HYDAC, your fluid is in safe hands

We know your fluid and welcome the opportunity to help you reduce the burden of fluid service. You will see for yourself the clear benefit of having a hydraulic or lubrication system that works perfectly, leaving you to concentrate fully on your specialism. Entrust us with your fluid and benefit from our Fluid Engineering package since this ensures:

- **A long system life**
  thanks to better component protection.
- **A definite cost saving**
  due to reduced operating and downtime costs.

And fits all housings, fluids and cleanliness classes.

Intelligent fluid service

By making use of HYDAC fluid service specialists.

In fluid service, too, you can benefit from decades of experience and development.

How HYDAC's excellent fluid service benefits you:

- **On-site diagnostics with our laboratory vehicles**
- **Specialist staff available on demand**
- **Lower costs thanks to professional oil sample analysis, monitoring and support** (condition-based maintenance)
- **Lower maintenance and spare part costs**
- **Increased operating reliability due to fewer breakdowns**

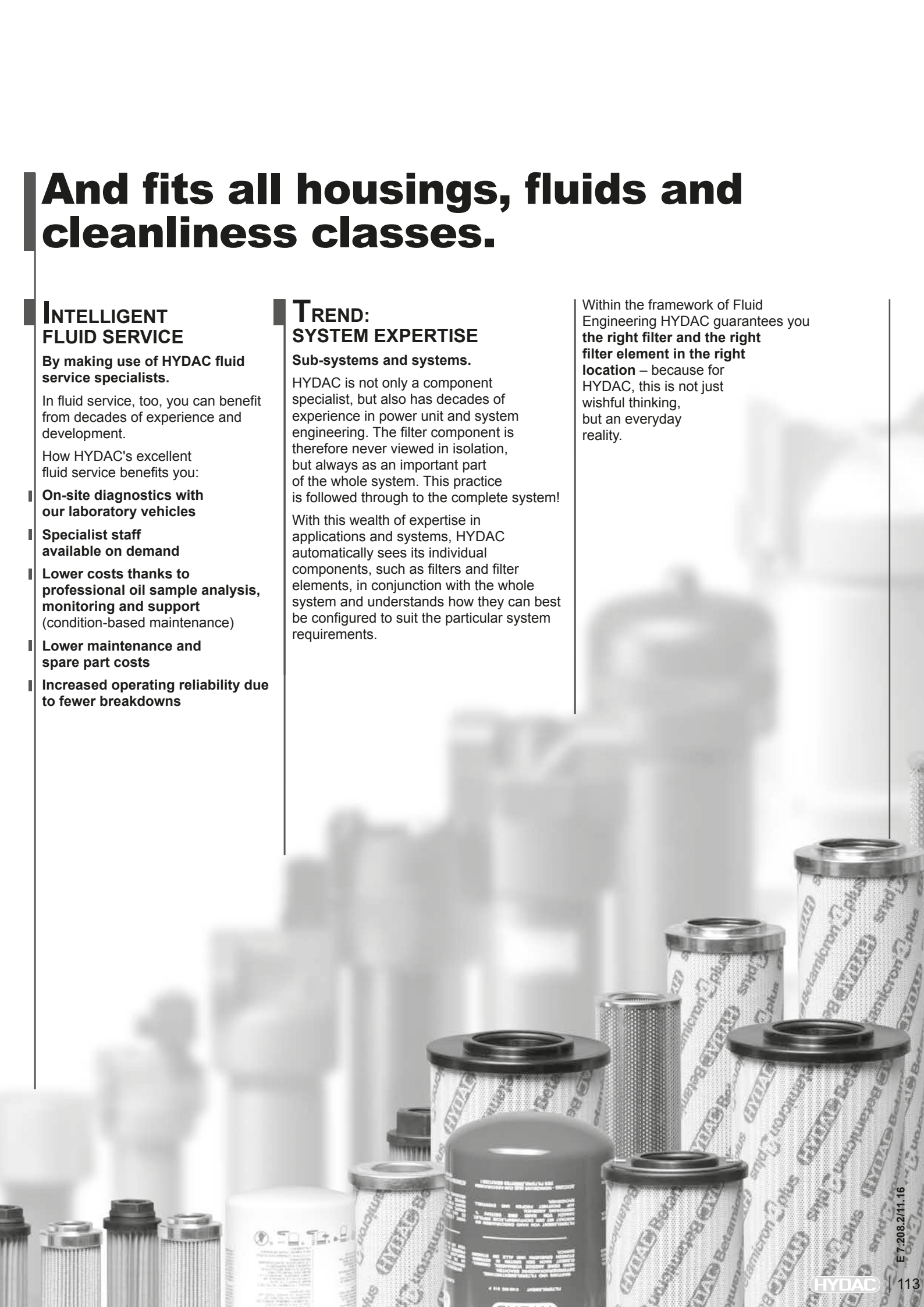
Trend: system expertise

Sub-systems and systems.

HYDAC is not only a component specialist, but also has decades of experience in power unit and system engineering. The filter component is therefore never viewed in isolation, but always as an important part of the whole system. This practice is followed through to the complete system!

With this wealth of expertise in applications and systems, HYDAC automatically sees its individual components, such as filters and filter elements, in conjunction with the whole system and understands how they can best be configured to suit the particular system requirements.

Within the framework of Fluid Engineering HYDAC guarantees you **the right filter and the right filter element in the right location** – because for HYDAC, this is not just wishful thinking, but an everyday reality.



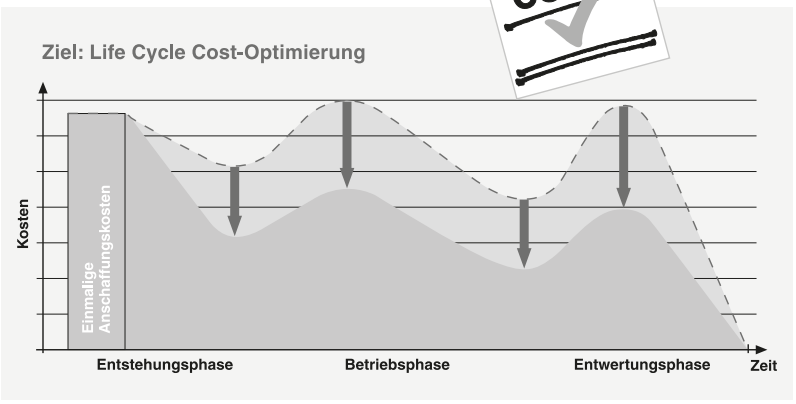
Don't gamble with your components.

Our advice: Invest in genuine quality!

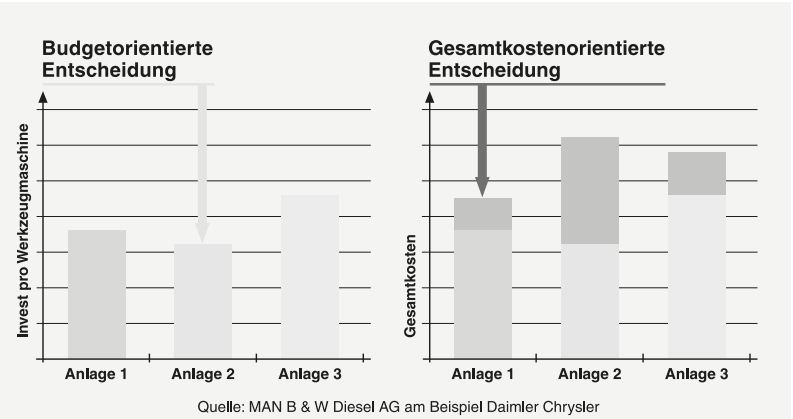
The many years' development in the area of element technology is your guarantee of first class quality in Hydac filter elements and this applies equally to the **Betterfit range**.

By using Betterfit elements, the **Life Cycle Cost** of your system will be optimized, thereby reducing the total costs of the machine or a component, from procurement right through to disposal. Reducing these costs is one of the **megatrends** pursued by large-scale end users in machine building.

Leading automotive manufacturers demand, for example, authoritative data on the **Life Cycle Cost** and the values derived from it – e.g. for machine tools for 10 years life, for presses even up to 30 years life. New investments by machinery manufacturers are decided on the basis of the machine prices and the Life Cycle Cost calculation provided.



Cost progression during the whole life cycle of the machine / system

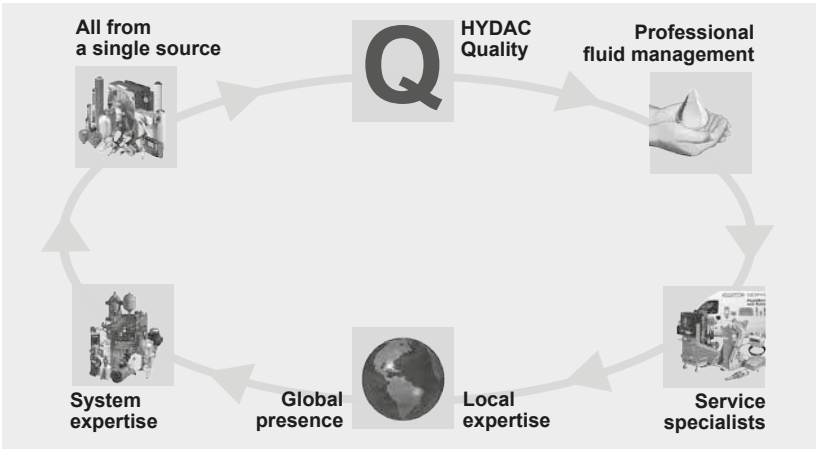


The winners in terms of system properties

With Us, Your Fluid is in Safe Hands.

The specialists at HYDAC have a good knowledge of your fluid and welcome the opportunity to help you reduce the burden of fluid service. You will see for yourself the clear benefit of having a hydraulic or lubrication system that works perfectly, leaving you to concentrate fully on your area of expertise.

When you decide on a HYDAC Betterfit element, you are not "just" buying a filter element, but you are also benefitting at the same time from the HYDAC network of expertise and service available worldwide:



Highest level of operating reliability for your applications
In HYDAC you have a professional partner for all aspects of fluid cleanliness and operating reliability for your system.

The complete HYDAC Betterfit range currently comprises approx. 23,000 elements and is growing daily.

The HYDAC filter range is also impressive with over 50 types of filter in every conceivable size and type. In addition, new individual solutions are constantly being developed, partly in active development partnership with the manufacturers.

HYDAC filters offer you the following advantages.

Low costs
the filter elements and housings are optimized for the particular industry

Easy maintenance
simple element change and easy-to-install filter housing

High level of operating reliability
filter media have high filtration efficiency for exceptional cleanliness classes and benefit from a high level of production quality

Low operating costs
particularly low pressure drops across filter and filter element for low energy consumption

All components and systems from one company
providing comprehensive system know-how and integrated system approach

Worldwide availability and advice
provided by our worldwide network of regional offices, agents and service partners

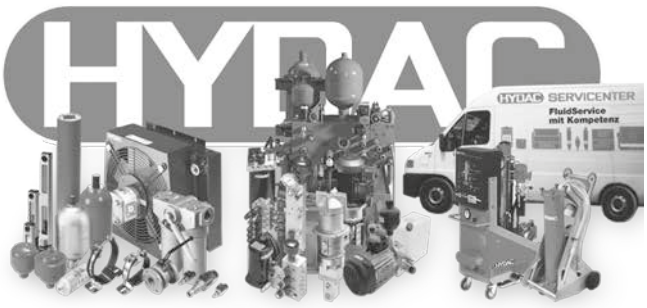
HYDAC, your Partner for Hydraulics and Lubrication Applications.

With 8,000 employees worldwide, HYDAC is one of the leading suppliers of fluid technology, hydraulic and electronic equipment.
Our wide range of products, combined with our established expertise in all aspects of hydraulics and lubrication applications qualify HYDAC to be your professional partner for every aspect of hydraulics. Particularly in the area of filtration you will profit from the decades of HYDAC experience and development successes.
Our quality and environment certification ISO 9001/2000 and ISO 18001 denote first class quality and responsible management of our resources.
That's why you can count on HYDAC - we provide, you profit.

All from one supplier.

HYDAC will help find the solution for you!

From first class components right up to turnkey system solutions, from support during commissioning to maintenance and optimization, from professional filtration, to oil condition monitoring and expert cooling.



First class laboratory and testing expertise in the HYDAC Fluid Care Center

The new Fluid Care Center, specifically designed for filters and filter monitoring, is an important component in HYDAC fluid management and the HYDAC service concept. Equipped with the most up-to-date instruments and test rigs, it offers a huge range of options for fluid analysis and application-specific filtration efficiency testing.
In our new laboratories, highly qualified staff are dedicated to continuously improving products and developing applications as well as carrying out analyses to customer specification – always tailored to the particular operating conditions. In addition to the central facility at our headquarters there are further laboratories and mobile fluid laboratories in several HYDAC centres in Germany and overseas.

Just one example of the numerous filter testing procedures: **Multipass test rig.**

Oil analysis in the HYDAC laboratory at company headquarters.

NOTE

The information in this brochure relates to the operating conditions and applications described.
For applications or operating conditions not described, please contact the relevant technical department.
Subject to technical modifications.

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