Filtration Products

01.E series
01.NR series
01.NL series
01.N series
01.AS/TS series
01.NBF series
01.WSNR series

High efficiency filter elements for hydraulic and lubrication oils

EATON
Powering Business Worldwide

Proven solutions for long element life and consistent performance

Eaton's hydraulic filtration product line features more than 4,000 high-quality filter elements with a high dirt-holding capacity to ensure consistent filter efficiency and long element life. These elements are available with various filter materials, different construction types and micron ratings to help protect critical system components.

Eaton's wide range of filter elements provide trouble-free operation when filtering abrasive fluids, cooling lubricants or water-based fluids and are designed to achieve cleanliness class requirements. Eaton can perform fluid analysis on-site or in our lab to determine the best filter element for your hydraulic and lubrication system requirements.

Features:

- High resistance to variable operating pressures and flow rates contribute to one of the highest dirt-holding capacities and filtration efficiencies on the market
- Filters contain more pleats and surface area than most competitors
- Consistent filter efficiency, even at high differential pressure

Benefits:

- Exceptional value and price-performance ratio
- Improved system reliability
- Decreased number of maintenance operations
- Lower maintenance costs
- Extended filter element life
- Customized solutions for specific filtration challenges
- Laboratory services
- Technical consulting and engineering support

Markets:

- Power generation
- Agriculture and construction
- Material handling
- Wind
- Oil and gas

Applications:

- Compressors
- Gearboxes
- Power units
- Lubrication modules
- Mobile hydraulics
- Factory equipment

Filter element selection guide

01.E pressure filter elements

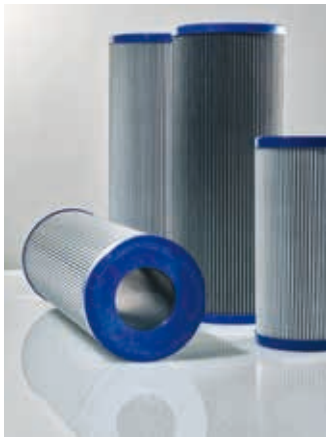
Nominal sizes: 30 – 1350
(30 bar and high resistance)
These elements are ideal for use in medium and high pressure in-line filters to protect system components such as valves and hydraulic motors.

01.E return-line filter elements

Nominal sizes: 41 – 950
(16 bar)
These elements are ideal for use in return-line filters to reduce the oil contamination in the hydraulic system.

01.E lubrication filter elements

Nominal sizes: 631 – 4001
(10 bar)
These elements are ideal for use in larger lubrication filters to protect system components and reduce oil contamination.



01.NR return-line filter elements

Nominal sizes: 63 – 1000
(10 bar)
These elements meet DIN 24550-4 standards and are ideal for use in return-line filters to reduce oil contamination.

01.NL in-line filter elements

Nominal sizes: 40 –1000
(30 bar and high resistance)
These elements meet DIN 24550-3 standards and are ideal for use in pressure filters to protect system components.

01.N in-line filter elements

Nominal size: 100
(16 bar)
These elements are ideal for use in low pressure in-line filters to protect system components such as valves and hydraulic motors.

01.AS and TS suction filter elements

Nominal sizes: 180 – 631
These elements are ideal for use in suction filters to protect sensitive hydraulic pumps.

01.NBF breather filter elements

Nominal sizes: 25 – 125
These elements are ideal for use in tank breather filters to protect the hydraulic fluid from contamination in the ambient air.

01.WSNR Watersorp off-line filter elements

Nominal sizes: 250 – 1000
(10 bar)
These elements are ideal for use in off-line filters to remove particles and water from the hydraulic system.

Technical data and product selection guide

Eaton's filter elements are designed to flow from the outside to the inside except for the AS and TS suction filter elements, which flow from the inside to the outside.

The nominal size of the filter element corresponds to the application flow rate in l/min at a filter fineness of $ß_{20\ µm(c)} \geq 200$. For easy filter sizing and calculation, you can use our Filter Selection tool at: www.eatonpowersource.com/calculators/filtration

Example for product key: **01.NL 630.10 VG.30.E.P.-**

Filter element type	Series	Nominal size	Grade of filter fineness	Filter material	Δ p resistance	Design	Sealing material	Specification
Pressure filter elements	01.E	30, 60, 90, 150, 170, 240, 360, 450, 600, 900, 1350	3 VG, 6 VG, 10 VG, 16 VG, 25 VG	VG = microglass	30 = 30 bar, 160 = 160 bar (high resistance)	E = single open end	P = Nitrile, V = Viton, others on request	- = standard elements, ISO6 = HFC applications, VA = stainless steel
			10 G, 25 G, 40 G, 80 G	G = stainless steel wire mesh				
Return-line filter elements	01.E	41, 55, 70, 120, 175, 210, 320, 330, 425, 625, 631, 950	3 VG, 6 VG, 10 VG, 16 VG, 25 VG	VG = microglass	16 = 16 bar	E = single open end, S = bypass valve with several opening pressure options	P = Nitrile, V = Viton, others on request	- = standard elements, ISO6 = HFC applications
			10 G, 25 G, 40 G, 80 G	G = stainless steel wire mesh				
Lubrication filter elements	01.E	631, 1201, 1501, 2001, 3001, 4001	3 VG, 6 VG, 10 VG, 16 VG, 25 VG	VG = microglass	10 = 10 bar	E = single open end, S = bypass valve with several opening pressure options	P = Nitrile, V = Viton, others on request	- = standard elements, ISO6 = HFC applications, ISO7 = refrigerator applications (NH_3), VA = stainless steel
			10 API, 25 API	API = microglass				
			10 G, 25 G, 40 G, 80 G	G = stainless steel wire mesh				
Return-line filter elements according to DIN 24550-4	01.NR	63, 100, 160, 250, 400, 630, 1000	3 VG, 6 VG, 10 VG, 16 VG, 25 VG	VG = microglass	10 = 10 bar	B = double open end	P = Nitrile, V = Viton, others on request	- = standard elements, ISO6 = HFC applications, ISO7 = refrigerator applications (NH_3), VA = stainless steel
			10 API, 25 API	API = microglass				
			10 G, 25 G, 40 G, 80 G	G = stainless steel wire mesh				
In-line filter elements according to DIN 24550-3	01.NL	40, 63, 100, 160, 250, 400, 630, 1000	3 VG, 6 VG, 10 VG, 16 VG, 25 VG	VG = microglass	30 = 30 bar, 160 = 160 bar (high resistance)	E = single open end, S = bypass valve with several opening pressure options	P = Nitrile, V = Viton, others on request	- = standard elements, ISO6 = HFC applications, ISO7 = refrigerator applications (NH_3), VA = stainless steel
			10 API, 25 API	API = microglass	30 = 30 bar			
			10 G, 25 G, 40 G, 80 G	G = stainless steel wire mesh	30 = 30 bar, 160 = 160 bar (high resistance)			
In-line filter elements	01.N	100	3 VG, 6 VG, 10 VG, 16 VG, 25 VG	VG = microglass	16 = 16 bar	E = single open end, S = bypass valve with several opening pressure options	P = Nitrile, V = Viton, others on request	- = standard elements, ISO6 = HFC applications, ISO7 = refrigerator applications (NH_3), VA = stainless steel
			10 API, 25 API	API = microglass				
			10 G, 25 G, 40 G, 80 G	G = stainless steel wire mesh				
Suction filter elements	01.AS	180, 220, 630, 631	10 G, 25 G, 40 G, 80 G	G = Stainless steel wire mesh	-	B = double open end	-	- = standard elements, ISO6 = HFC applications
Tank/Suction filter elements	01.TS	210, 310, 425, 625	10 G, 25 G, 40 G, 80 G	G = stainless steel wire mesh	-	B = double open end		- = standard elements, ISO6 = HFC applications
Breather filter elements	01.NBF	25, 40, 55, 85, 125	3 VL	VL = microglass	-	-	V = Viton	- = standard elements, ISO6 = HFC applications
			10 P	P = paper			P = Nitrile	
Watersorp off-line filter elements	01.WSNR	250, 630, 1000	3 WVG, 10 WVG	WVG = microglass with absorption layer	10 = 10 bar	B = double open end	P = Nitrile, V = Viton, others on request	- = standard elements

Assignment of filter element to filter housing

Filter housing type	Series	Filter element series and nominal size										
		01.E 30 - 1350	01.E 41 - 950	01.E 631 - 4001	01.NR 63 - 1000	01.NL 40 - 1000	01.N 100	01.AS 180 - 631	01.RS 225	01.TS 210 - 625	01.NBF 25 - 125	01.WSNR 250 - 1000
Return-line filters 	TEF	■	■	■								
	DTEF		■	■								
	TEFB	■	■									
	TRW		■									
	RF		■									
Return-line filters with suction connection 	TRS		■						■			
	TNRS				■							
Duplex pressure filters 	MDD					■						
	EHD/HDD	■										
	EDU/DU			■	■	■	■					
	DUV			■	■	■						
	DWF			■								
	EDA/DA				■	■						
Pressure filters, PN < 100 bar 	LF			■	■	■	■					■
Pressure filters, PN > 100 bar 	ML	■										
	MNL					■						
	MF	■										
	MFO	■										
	MLO	■										
	EH/HP	■										
	HPW	■										
	HPV	■										
	MDV					■						
	EHP	■										
Manifold mounted pressure filter, PN > 100 bar 	MNU					■						
	HNU					■						
	HPU		■									
	HPP	■										
	EHPF/HPF	■										
	HPX	■										
	HPY	■										
	HPFO	■										
	HPZ	■										
	FHP		■									
Tank mounted suction filters 	AS							■				
	TS									■		
	TSW									■		
Off-line filters 	NF				■							■
Tank breathers 	NBF										■	

Filter element material layers

Microglass (VG)

Multilayer, pleated construction made with synthetic microglass fiber.

Features:

- High retention of fine contaminates while maintaining performance over the life of the element
- High dirt-holding capacity
- High stability to variable operating pressures and flow rates
- High collapse resistance for added protection

Microglass (API)

Multilayer, pleated construction made with synthetic microglass fiber.

Features:

- Low differential pressure design for lubrication applications
- Fulfills the requirements of API 614 standard

Microglass with absorption layer (WVG)

Multilayer, pleated construction made with synthetic microglass fiber.

Feature:

- Combines removal of solid contamination and water removal by using a microglass and a water absorption layer

Stainless steel wire mesh (G)

Single or multilayer, pleated construction made with stainless steel wire mesh in different weaves, depending on retention ratings.

Features:

- Removes particulate from heavily contaminated fluids
- Protects pumps with a minimal pressure drop decreasing the risk of cavitation
- Compatible with a wide range of fluid types

Paper (P)

Single layer, pleated construction made with organic cellulose fiber fleece used for flushing operations.

Filter efficiency data

Multi-pass performance according to ISO 16889

Calculation of the filtration quotient $ß_{x\ µm(c)}$

$$ß_{x\ µm(c)} = \frac{\text{amount of particles of the size} \geq x\ µm_{(c)}\ \text{before the filter}}{\text{amount of particles of the size} \geq x\ µm_{(c)}\ \text{after the filter}}$$

Conversion of filtration quotient $ß_{x\ µm(c)}$ into filtration efficiency (in %)

$$\frac{\text{filtration quotient} - 1}{\text{filtration quotient}} \times 100 = \%$$

e.g.

$ß_{10\ µm(c)} = 200 \rightarrow \frac{(200-1)}{200} \times 100 = 99.5\%$

In addition to proprietary tests developed by Eaton, filter elements are tested according to several ISO standards:

ISO 2941 Verification of collapse/burst pressure rating

ISO 2942 Verification of fabrication integrity

ISO 2943 Verification of material compatibility with fluids

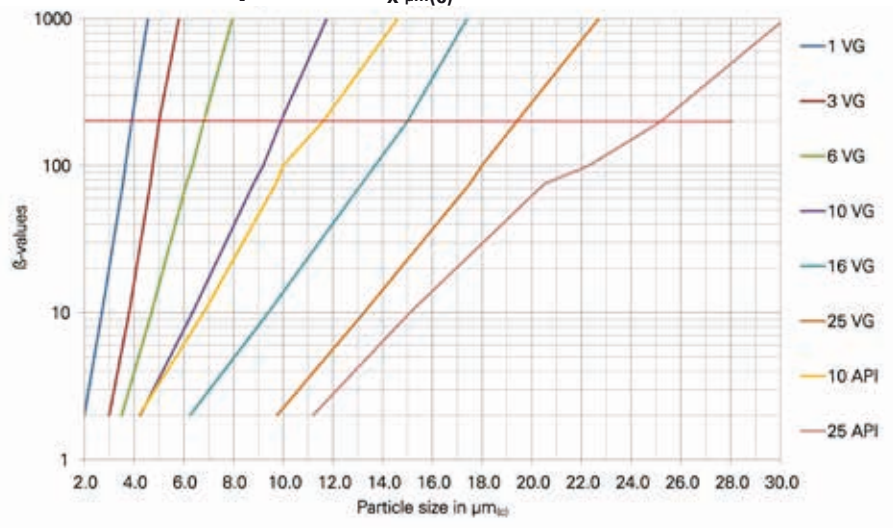
ISO 3723 Method for end load test

ISO 3724 Determination of resistance to flow fatigue using particulate contaminant

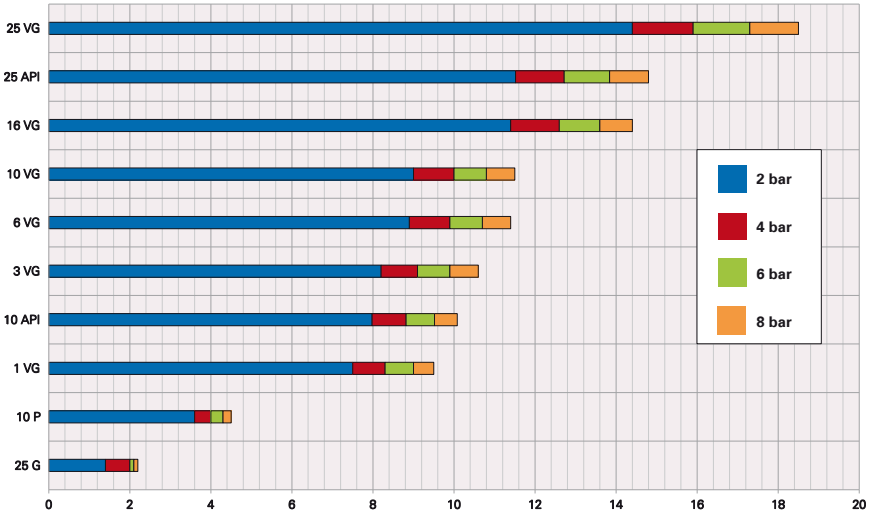
ISO 3968 Evaluation of pressure drop versus flow characteristics

ISO 16889 Multi-pass method for evaluating filtration performance

Filtration quotient $ß_{x\ µm(c)}$ for filter materials



Dirt-holding capacity according to ISO 16889



Dirt-holding capacity according to ISO 16889 (test dust: ISO-MTD) of different filter media and filtration grades. Dirt-holding capacities at 2, 4, 6, 8 bar pressure differential.

Systems sensitivity and optimal cleanliness class

System types Application case	Req. class acc. to ISO 4406:99	Req. class acc. to NAS 1638	Recommended Eaton filter material
Against fine soiling and gumming up of sensitive systems	16/12/8	2-3	1 VG
	17/13/9	3-4	3 VG
Heavy-duty servo motor systems; high pressure systems with long service life	19/15/11	4-6	6 VG
Proportional valves; industrial hydraulics with high operating safety	20/16/13	7-8	10 VG
Mobile hydraulics; common mechanical engineering, medium pressure systems	22/18/14	7-9	16 VG
Heavy industries; low pressure systems; mobile hydraulics	23/19/15	9-11	25 VG

The cleanliness of the oil in a hydraulic system is determined by the micron rating of the filter element, the specific contaminant, and the size and distribution of the particles in the fluid.

This table presents standard data values. The quality of a particular oil can be determined using established analysis procedures.

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