Medium Pressure Filters

8650/8656 Series

'Rotolok' Filters

PORT SIZE 1", 1¼" 1½"

PALL

Pall Industrial Hydraulics

TOTAL CLEANLINESS CONTROL

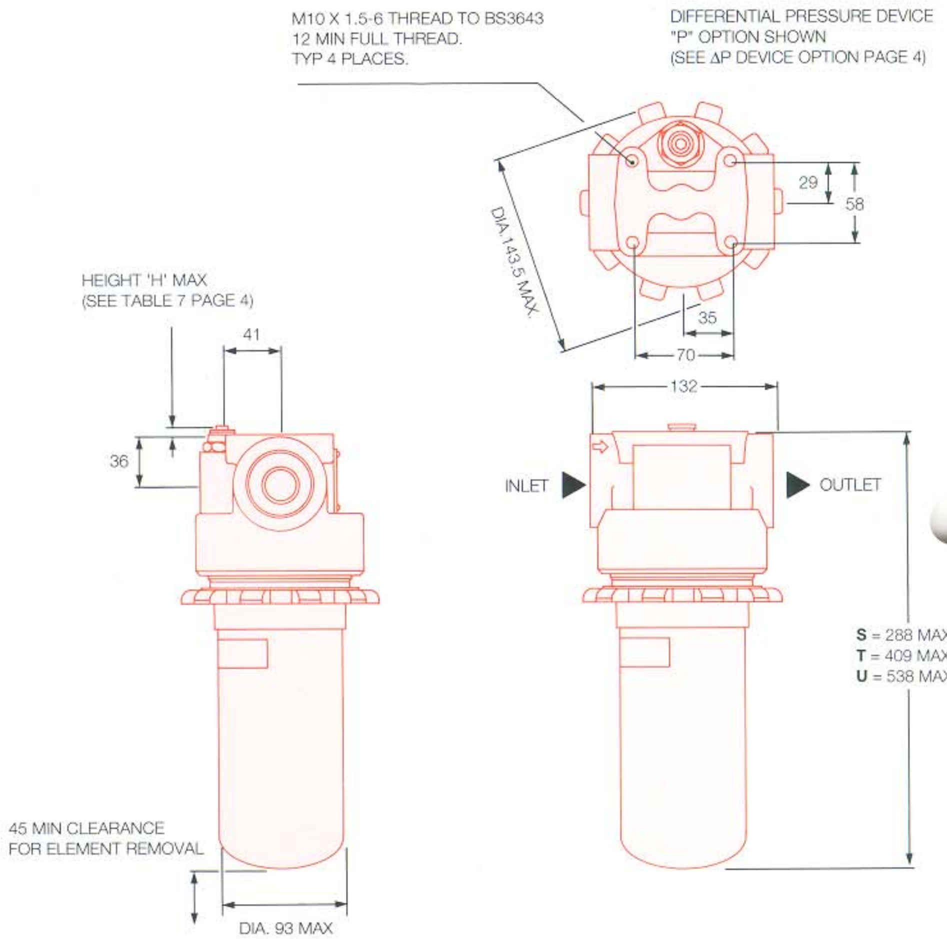
Technical Information

Operating pressure 40 bar.

20 bar collapse rated elements fitted with bypass valves.
40 bar collapse rated without bypass valve.

Compatible with all petroleum oils, water glycols, water-oil emulsions and most synthetic hydraulic and lubrication fluids.

All dimensions in mm unless otherwise stated



Filter dry weight Kgs

Length	Dry Mass
S	4.0
T	4.5
U	5.0

Removal ratings

Multi-pass Filtration Ratings is per ANSI/NFPA T3.10.8.8R1 and ISO4572 modified for Silt Control with In-line Particle Counting

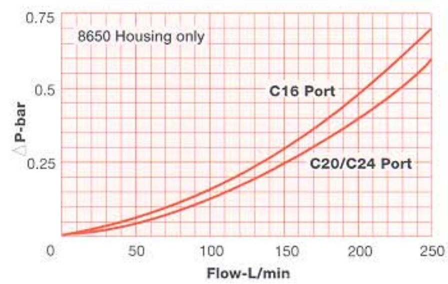
Element & Media		Micrometre Size for Beta (ßx) values				Filtration Ratio			Terminal Δ P bar
		ßx=2	ßx=20	ßx=75	ßx≥200	ß2	ß10	ß20	
9600	KZ	<1	<1	<1	<1	>3000	>3000	>3000	4
9600	KP	<2	<2	2.2	3	60	>3000	>3000	4
9600	KN	<2	2.7	4.6	6	12	>3000	>3000	4
9600	KS	2	7	9.9	12	2	80	>3000	4
9600	KT	10	18	22	25	NA	2	40	4
9606	DS	2	7	9.9	12	2	80	>3000	16

For the application of 'Ultipor III' filters for flushing it is recommended that a ßx≥1000 rating at the critical particle size is used. 'Pall' flushing media are rated KZ=1; KP=5.3 and KN=8.3 micrometres at ßx≥1000.

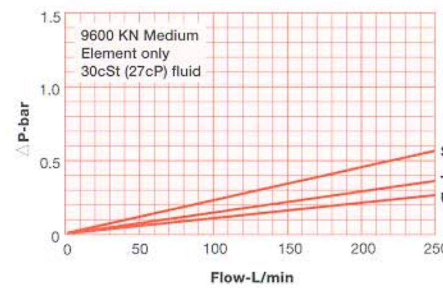
Technical Information

Filter assembly clean pressure drop = ΔP housing + ΔP element

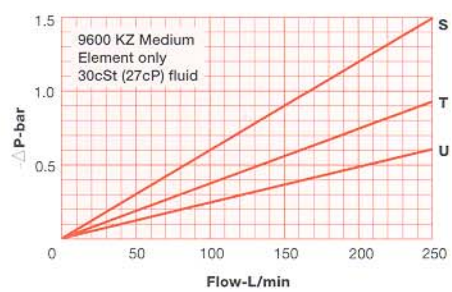
Housing pressure drop. Using fluid with s.g. 0.9 housing pressure drop is directly proportional to specific gravity.



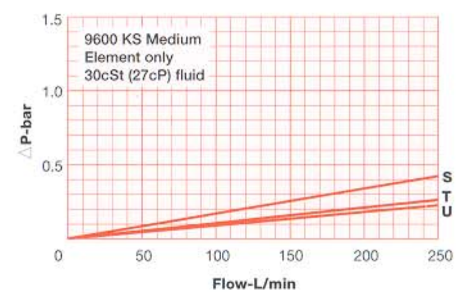
KN element only S, T and U lengths. Element pressure drop is directly proportional to absolute viscosity*.



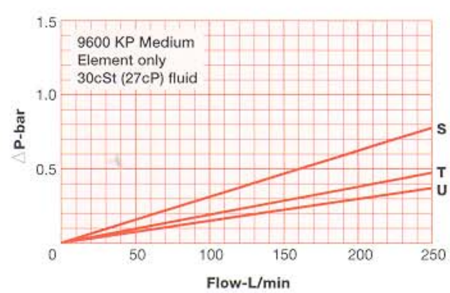
KZ element only S, T and U lengths. Element pressure drop is directly proportional to absolute viscosity*.



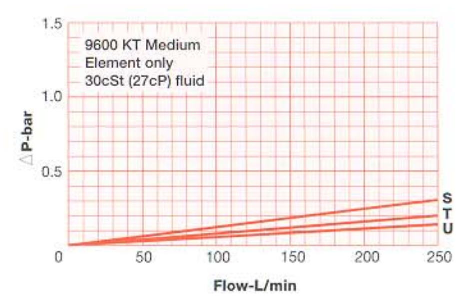
KS element only S, T and U lengths. Element pressure drop is directly proportional to absolute viscosity*.



KP element only S, T and U lengths. Element pressure drop is directly proportional to absolute viscosity*.



KT element only S, T and U lengths. Element pressure drop is directly proportional to absolute viscosity*.



Sample ΔP calculation

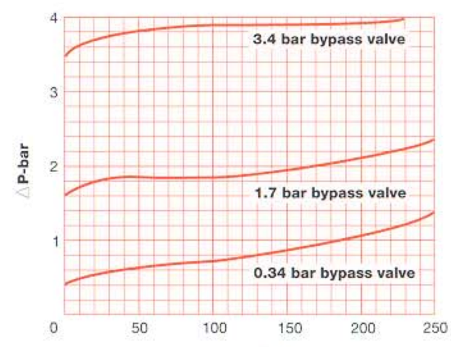
HH8650C16KSSBM 150 L/min flow rate using a hydraulic fluid at 20cSt and specific gravity 0.87:

ΔP assembly = ΔP housing + ΔP element
= (0.3 x 0.87/0.90) + (0.27 x 20/30 x 0.87/0.90)
= 0.29 (housing) + 0.17 (element)
= 0.46 bar clean assembly pressure drop

*Absolute viscosity is measured in units of centipoise (cP) which equals kinematic viscosity in centistokes (cSt) x specific gravity (s.g). Therefore, element ΔP from curve should be corrected by multiplying by:

New viscosity in cP/27
or new viscosity is cSt/30 x new specific gravity/0.9

Bypass valve curves. Bypass valve pressure drop at full bypass flow using fluid with s.g. ≤ 0.9. Valve pressure drop is directly proportional to fluid specific gravity.



Ordering Information

Filter Assembly 'Pall' Part No: **H** [Table 1] **865** [Table 2] **C** [Table 3] [Table 4] [Table 5] [Table 6] [Table 7] [Table 8]

Replacement Element 'Pall' Part No: **HC960** [Table 2] **F** [Table 4] [Table 5] [Table 1]

Seal Kit 'Pall' Part No: **H8650SK** [Table 1]

Table 1

SEAL TYPE		
CODE	**Seal Material**	**Fluid Service**
H	Nitrile	Petroleum, water-oil emulsions, water glycol.
Z	Fluorocarbon	Specified synthetics.

Table 2

ELEMENT COLLAPSE RATING	
CODE	**Option**
0	20 bar diff. for housings with bypass valve.
6	40 bar diff. for housings without bypass valves. 'Dirt-Fuse' element option.

Table 3

PORT SIZE	
CODE	**Option**
16	1"
20	1¼"
24	1½"

Table 4

FILTER ELEMENT		
MEDIUM CODE	**Element Type**	**Rating (µm) ($\beta x \geq 200$)**
KZ **KP** **KN** **KS** **KT**	Standard 20 bar diff. Collapse rated elements.	<1 3 6 12 25
US	40 bar diff. Collapse rated element.	10

Table 5

LENGTH		
ASSEMBLY CODE	**ELEMENT CODE**	**Dry Wt. Kg**
S	**8**	4.0
T	**13**	4.5
U	**16**	5.0

Table 6

BYPASS VALVE		
CODE	**Option**	**Available for**
A	1.7 ± 0.3 bar bypass only.	8650
B	3.4 ± 0.3 bar bypass only.	8650
E	0.34 ± 0.03 bar bypass (No ΔP device).	8650
W	No bypass valve.	8656

Table 7

ΔP DEVICE		
CODE	**Option**	**'H' Dimen-sions**
O	Unmachined ΔP port. Cannot be modified to any of the options listed.	-
B	Bleed plug and seal plug in place of ΔP device.	8mm
F	ΔP plug adaptor. Connections (2) 1/4" BSP female ports. (For element upstream and downstream pressure connection or sampling).	30mm
D	Visual indicator - as option P but without thermal lockout.	23mm
P	Visual indicator - with thermal lockout and manual reset. No signal below 0°C; signal above 27°C. Indicator includes clear plastic cover and filter screen protection for ΔP piston. Button rises 5mm on actuation.	23mm
E	Stainless steel visual indicator - button rises 5mm on actuation, remains up until manually reset.	23mm
L	Electrical switch - SPDT. Connection: M25 conduit threads, (3) Colour coded 150mm flying leads. Automatic reset.	38mm
Q	Electrical switch - SPDT. Automatic reset. Waterproof to IEC Class IP65. Sheathed cable 3x colour coded 1000mm flying lead.	59mm
M	Electrical switch - SPDT. Automatic reset. Connection plug and socket per DIN43650. ISO4400 (Hirschmann type). Weatherproof to IEC Class IP65.	78mm
R	Electrical switch - SPDT with neon light indicator. Automatic reset. Connection: plug and socket as per DIN43650 ISO4400 (Hirschmann type). Weatherproof to IEC Class IP65.	90mm
T	Electrical switch - SPDT. Automatic reset. Connection plug as per DIN43650. ISO4400 (Hirschmann type). Socket not supplied.	49mm
V	Combined visual electrical indicator. SPDT manual reset. Connection plug and socket as per DIN43650 ISO4400 (Hirschmann type). Weatherproof to IEC Class IP65.	68mm
X	Electrical switch - SPDT. Automatic reset for use in underground and hazardous environments.	71mm
W	Electrical switch - SPDT. Automatic reset. For use in hazardous environments. Explosion protected to CENELEC EN 50014 Class EExdIICT6.	47mm
Z	Sensor plus monitor display unit. 3 LED visual indication; normal condition (green), 75% rated ΔP (amber), 100% rated ΔP (red). Temperature indication: <30°C to 100°C. Analogue output for computer link	70 mm
	Pressure settings 1.1 ± 0.2 bar diff. - with 1.7 bar bypass. 2.4 ± 0.3 bar diff. - with 3.4 bar bypass. 6.9 ± 1 bar diff. - with non-bypass.	

Table 8

MINING OPTION ONLY	
CODE	**Specification**
YMIN	Aluminium-free filter with white paint to British Coal spec. 520.

Mining option notes (Ref Table 8)

- Replacement element part number designation changes to HC9620. Remaining codes are standard.
- ΔP Devices. Use code options "E" and "X" for mining use.

Example filter assembly 'Pall' Part Number HZ8650C16KSSBP

This is a 8650 bypass filter assembly with fluorocarbon seals for industrial grade phosphate ester fluids and 1" BSP ports. Filter element is rated a 20 bar diff. collapse and 12 micrometre rating ($\beta_{12} \geq 200$). "S" length element and bowl. Bypass assembly (3.4 bar cracking). Pop-up visual indicator with thermal lock-out. The replacement element for this assembly is **Pall** Part Number HC9600FKS8Z.

Features and Benefits

Features and Benefits

Differential pressure devices
Optional visual and electrical indicating devices provide accurate and reliable indication of the need for element service. Differential pressure devices are mechanically independent of the bypass valve and signal *before* the bypass valve opens.

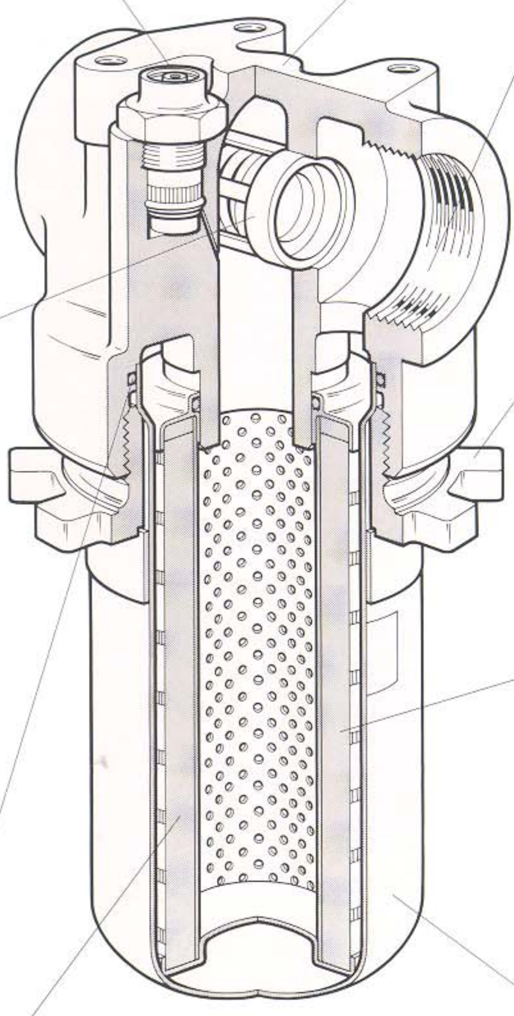
Sampling
Pall sampling units can be used in the differential pressure indicator port to permit sampling of system fluid without breaking lines.

Bypass valve
Full flow low inertia bypass valve mounted in the filter head between inlet and outlet port. Operation is independent of clogging indicator. Instantaneously responds to limit the differential pressure across the element during cold starts and flow surges and can handle full flow if element is blocked to minimise the possibility of element collapse and fatigue.

The bypass flow path design ensures the fluid does not impinge of pass over the element in bypass mode. This prevents contamination being washed off dirty element during bypass.

Positive sealing
Standard O-rings are used throughout. O-rings are more reliable than flat gaskets. Sealing does not depend on torque loading. Standard seals are readily available in the field.

Ultipor III elements
Ultipor III filter medium is a unique 'composite' structure with a fixed, graded pore construction of inert, inorganic fibres impregnated and bonded with specifically formulated proprietary resins for unsurpassed service life. Removal ratings at ($\beta x \geq 200$) <1, 3, 6, 12 and 25 micrometres. **Ultipor III** filters have upstream and downstream support to resist cold start, flow fatigue and pleat bunching or lay over.



Ferrous housing of non-welded construction
Rugged construction rated for 40 bar working pressure. Superior strength and fatigue resistance compared to fabricated and spin-on construction.

Optional ports and mounting
Port options 1", $1\frac{1}{4}$" and $1\frac{1}{2}$" BSP parallel ensures installation versatility for pipe mounting.

Unique Rotolok filter design
The **Rotolok** filter ring is a captive threaded coupling on the filter bowl to the filter head, ensuring rapid, easy element change by hand with no tool requirements.

Fully supported element construction for out to in flow
Gives high collapse strength and filtration integrity. **Ultipor III** spiral wrap provides uniform diffused flow throughout the length of the element for optimum filtration economy. Self-centering element for ease of installation.

Steel Bowl
The **Rotolok** filter uses a heavy drawn steel bowl for 40 bar working pressure.

Specifications

Filter assembly data

Installation:	Refer to service instructions PIH-SI-865.
Temperature range:	Nitrile: -43°C to + 120°C. Fluorocarbon seals: -29°C to + 120°C. 60°C maximum for water glycols and high water containing fluids (HWCF).

Housing data

Materials:	Head-cast iron; bowl, carbon steel; ring, carbon steel; valve, corrosion resistant materials.
Seals:	Nitrile or fluorocarbon standard O-rings.
Pressure rating:	Maximum operating pressure: 40 bar. Burst pressure (typical): 160 bar min. Fatigue life: at 0-40 bar in excess of 10^7 cycles.
Bypass valve settings:	8650 Series: 3.4 ± 0.3 bar diff. cracking pressure. 1.7 ± 0.3 bar diff. cracking pressure. 0.34 ± 0.03 bar diff. cracking pressure. 8650 Series: none. **Dirt-Fuse** element option.
Ports:	Inlet and outlet: 1, 1¼" and 1½" BSP parallel female thread.
Finish:	Paint on a phosphate base.
Dry weight:	See table 5 on page 4.

Differential pressure devices

ΔP switch and indicator settings:	8650 Series: 1.1 ± 0.2 bar diff. or 2.4 ± 0.3 bar diff. 8656 Series: 6.9 ± 1 bar diff.
Electrical switch ratings:	110VAC = 4A (inductive), 4A (resistive). 220VAC = 4A (inductive), 4A (resistive). 28VDC = 3A (inductive), 5A (resistive). 48VDC = 1A (inductive), 1.5A (resistive). 125VDC = 0.25A (inductive), 0.5A (resistive).

Disposable filter element data

Filter element hardware:	Corrosion-protection carbon steel end caps and core.
Filter medium:	**Ultipor III** elements are a 'composite' structure with inert, inorganic fibres, in a graded pore construction, impregnated and bonded with resins.
Removal ratings per ISO4572, BS6275:	See table on page 2. Ask for Pall multi-pass brochure PIH-MP.
Element collapse strength ratings per ISO2941:	9600 Series: 20 bar diff. minimum. 10 bar minimum for water glycols/high water containing fluids (HWCF). If operating at greater than 50°C, contact Pall Sales office. 9606 Series: 40 bar diff. minimum.
Flow fatigue resistance: per ISO3724:	Contact Pall: filter medium is fully supported to achieve maximum fatigue cycle life.
Fluid compatibility per ISO2943:	Compatible with petroleum oils, water glycols, water-oil emulsions, HWBF and those synthetic hydraulic fluids rated for use with fluorocarbon seals.
Fabrication integrity test per ISO2942:	Bubble point in isopropyl alcohol.

Because of developments in technology these data or procedures may be subject to change. Consequently we advise users to review their continuing validity annually.

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PALL

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