Static control filter elements

Filtration Technology improving safety and oil life time

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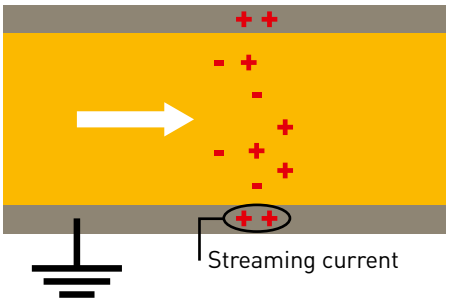
Static-Electric charging of oil red

Parker is pleased to present new patent-pending solutions to eliminate the negative impact of electro-static charging. Hydraulic fluids can be sensitive for electro-static charging when being pumped through a system or flowing through a fiberous synthetic filter media structure. The particles/ molecules in the hydraulic fluid can gain electro-static load. The problem is related to the negative impact of discharing this load.

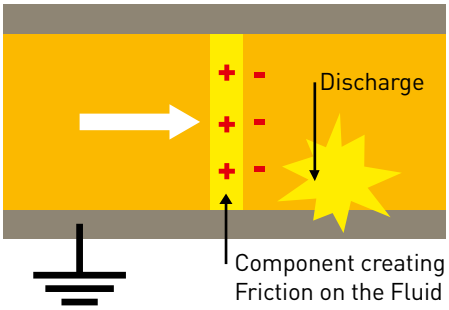
Electro-static charging can result in a sudden static discharge (sparks in oil) that, as a consequence, creates local micro hot spots in the oil. Like lightning the discharge occurs in milli-seconds and are associated with a very high temperature increase of the oil.
This temperature increase causes damage to the molecular structure of the oil and hence affecting its performance.
The process of electro-static charging can eventually cause varnishing in the system.

Fluid with good conductivity



Electro-static charging can occur everywhere in the system. A conductive fluid is able to prevent the local accumulation of electro-static charge.
In various components connected to earth a streaming current can be measured.

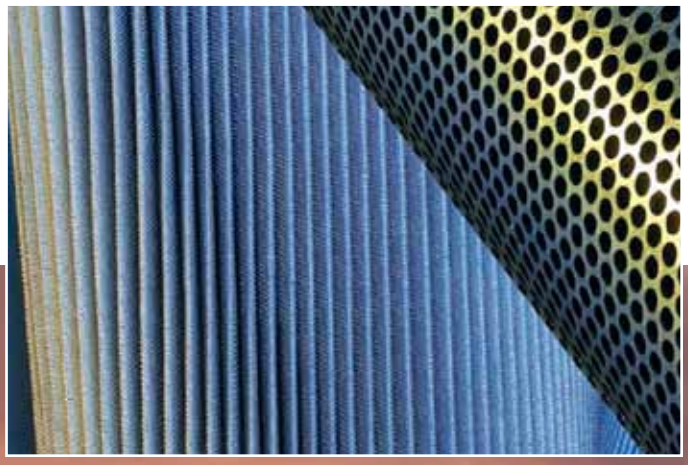
Fluid with reduced conductivity



When the fluid conductivity is too low, the amount of Electro-static energy can achieve a level which is sufficient to create a sudden discharge. Just as a balloon can accumulate a specific volume of air, the lower the fluid conductivity the more electro-static energy can build up before a discharge (sparks in the oil) occur.

Because the discharge often occurs directly downstream of the filter element, the sparks can burn holes in the filter media. This directly influences the filter efficiency.

Example of holes burned in the filter media.



uces Oil and System Life Time

Impact of oil groups

Differences among the base oil groups can have an impact on the presence of the electro-static discharge process in systems.

Group I oils are usually applying a mixture of different hydrocarbon chains with limited or no uniformity. Typically these oils are used in basic applications.

Group II and III oils are in general more applied for demanding applications. **The lower zinc content can have a negative impact on the fluid conductivity.** Group III oils are commonly mixed with additives and positioned as synthetic or semi-synthetic oils. Oil manufacturers can decide to add additives to improve the fluid conductivity.

Group IV are more often applied for automotive and industrial applications, using chemical engineered base stocks like Polyalphaolefins (PAO's).

Group V includes Esters and Polyolesters, these are not used as base oils in the basis but added to other base oil. This influences the conductivity among the oil covered by this group.

Static-free is a promise difficult to fulfil

The Electro-static phenomena can occur everywhere in the system. A filter can generate static electricity but other system components like pumps, valves, hoses and piping as well.

The parameters influencing the Electro-static phenomena are mainly:

- Type of oil
- Oil Temperature
- Air content of the oil
- Relaxation time of the oil in the hydraulic reservoir
- Fluid velocity in the system
- Electro-static energy created by components with rotating parts
- Conductivity & earthing of hoses and piping
- Weather conditions (not mathematically defined)

How can we help?

It is not only a filter, the overall portfolio of system components, circuit layout, oil brand and type and environmental conditions have an important influence on the electro-static process in systems and if it occurs to a level causing damage.

Parker Static Control Media is a effective solution to lower the overall impact of the electro-static process. **For a static-free solution, the complete system and its environments needs to be respected and evaluated, not only the filter.**

Parker can provide support with the analysis of the oil, wear & tear and contamination of system components and condition of filter elements.

Table I: Typical element proporties by oil group

	Group	I	II	III	IV	V
Element	P	+/- 0,05%	<0,05%	+/- 0,02%	Not included	Not included
Element	Zn	+/- 0,08%	<0,03%	<0,03%	Not included	Not included
Element	S	>0,03%	<0,03%	<0,03%	Not included	Not included
Viscosity Index	VI	80-120	80-120	>120	Not included	Not included
Saturation	%	<90%	>90%	>90%	Not included	Not included

All given values are indicative

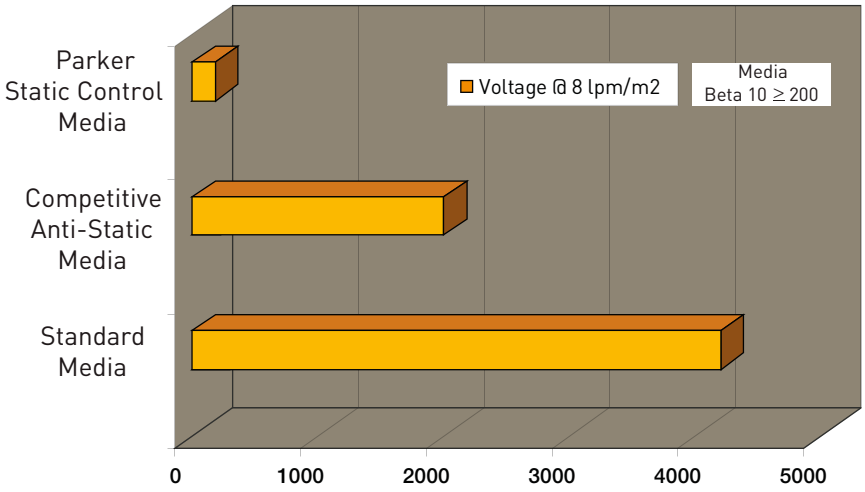
Static-Electric charging of oil red

Studies have been conducted and suggested that varnish is formed due to the thermal and oxidative degradation of the hydraulic fluid. The discharge process in the oil can create thermal degradation of the oil. In addition to this, the discharge process can cause pitting of component surfaces.

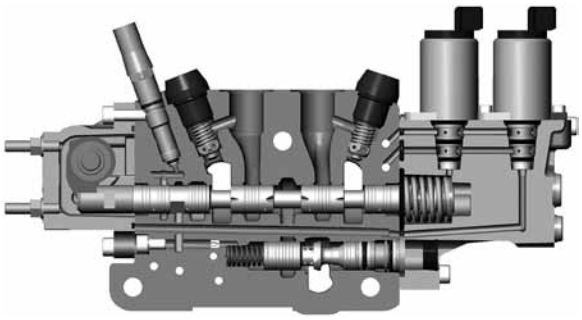
Varnish can cause system damage and lower system productivity by:

- Varnish build-up on surfaces, blocking flow path of components like heat exchangers
- Causing sticking (servo-) valves
- Slower response of system components with moving parts
- Plugging filters

LABORATORY TEST RESULTS



MEASURED DISCHARGE VOLTAGE



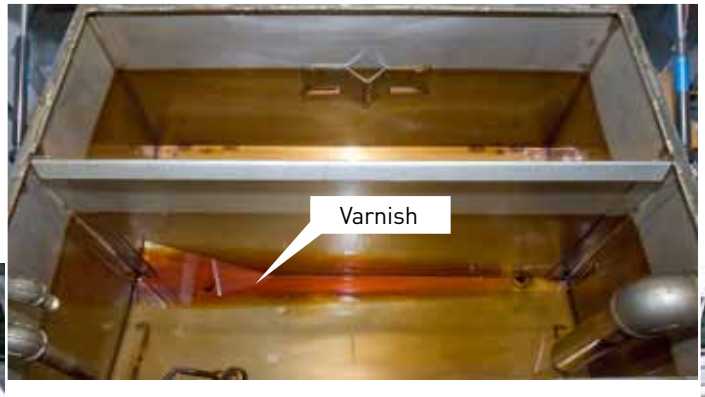
Varnish can block flow channels or cause stick-effect in valves

Test parameters for above results

Fluid Type:	ISO 46 Ashless Hydraulic Oil
Fluid Conductivity:	< 100 pS/m
Test Temperature:	40°C
Filter Type:	In-Line T-type Pressure
Media Flow Density:	320 lpm/m^2

Why use Parker static control filter elements

- No compromise in efficiency, dirt holding capacity, or flow pressure drop
- No vessel modifications required - drop in solution
- Available in a wide variety of element configurations



Varnish is attracted to metal surfaces, the result is an overall decrease in productivity.

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Parker filters available with static control media

TTF Series
Tanktop Mounted Return Line Filters, Max 500 l/min - 10 bar

- Aluminum filter head housing
- In-to-out flow
- ATEX certified version available
- Multiple- return ports (on request)

STF Series
Tanktop Mounted Return Line Filters, Max 500 l/min - 10 bar

- Steel filter housing
- In-to-out flow
- ATEX certified version available
- Multiple- return ports (on request)

BGT Series
Tanktop Mounted Return Line Filters, Max 2400 l/min - 10 bar

- Aluminium filter housing
- In-to-out flow
- ATEX certified version available
- Multiple- return ports (on request)

15/40/80CN Series
Medium Pressure Filters, Max 600 l/min - 70 bar

- Aluminium filter housing
- Excellent fatigue pressure ratings
- ATEX certified version available

EPF *i*protect® (Ecological Pressure Filter)
High Pressure Filters, Max 700 l/min - 450 bar

- Steel filter housing
- Pateted filter element and reduction of waste typically over 50%
- Reduced service area
- ATEX certified version available

Other filter types on request

Static-Electric charging of oil red

Part Number	Flow L/min	Bypass	Ports	Included Options	Micron Rating Bx(c)>200	Replacement Element Part Numbers
TTF302ABP2EG121	90	1.5 bar	G¾	None	2	937750A
TTF310ABP2EG121	90	1.5 bar	G¾	None	10	937786A
TTF602ABP2EG203	170	1.5 bar	G1¼	Diffuser type T	2	937747A
TTF610ABP2EG203	170	1.5 bar	G1¼	Diffuser type T	10	937783A
TTF802ABP2EG203	300	1.5 bar	G1¼	Diffuser type T	2	937745A
TTF810ABP2EG203	300	1.5 bar	G1¼	Diffuser type T	10	937781A
TTF1002ABP2HG24A	500	2.0 bar	G1½	Diffuser type T	2	944673A
TTF1010ABP2HG24A	500	2.0 bar	G1½	Diffuser type T	10	944674A

Part Number	Flow L/min	Bypass	Ports	Included Options	Micron Rating Bx(c)>200	Replacement Element Part Numbers
STF802ABP2ELC24G	300	1.5 bar	1½" SAE-flange	Airtight funnel type T	2	937745A
STF810ABP2ELC24G	300	1.5 bar	1½" SAE-flange	Airtight funnel type T	10	937781A
STF1002ABP2ELC24G	500	1.5 bar	1½" SAE-flange	Airtight funnel type T	2	944673A
STF1010ABP2ELC24G	500	1.5 bar	1½" SAE-flange	Airtight funnel type T	10	944674A

Part Number	Flow L/min	Bypass	Ports	Included Options	Micron Rating Bx(c)>200	Replacement Element Part Numbers
BGT1202ABPER323	500	1.5 bar	2" SAE-3000-PSI	Diffuser type T	2	937741A
BGT1210ABPER323	500	1.5 bar	2" SAE-3000-PSI	Diffuser type T	10	937777A
BGT1502ABPER483	1000	1.5 bar	3" SAE-3000-PSI	Diffuser type T	2	937738A
BGT1510ABPER483	1000	1.5 bar	3" SAE-3000-PSI	Diffuser type T	10	937774A
BGT1702QBPER483	1500	1.5 bar	3" SAE-3000-PSI	Diffuser type T	2	937737A
BGT1710QBPER483	1500	1.5 bar	3" SAE-3000-PSI	Diffuser type T	10	937773A

Performance of mobile equipment can also be influenced by electro static charging of oil.

Other products with Parker Static Control Media are on request

uces Oil and System Life Time

Part Number	Flow L/min	Bypass	Ports	Included Options	Micron Rating Bx(c)>200	Replacement Element Part Numbers
15CN102AVPKG164	50	3.5 bar	G1"	none	2	932610A
15CN110AVPKG164	50	3.5 bar	G1"	none	10	932612A
15CN202AVPKG164	100	3.5 bar	G1"	none	2	932616A
15CN210AVPKG164	100	3.5 bar	G1"	none	10	932618A
40CN102AVPKG244	180	3.5 bar	G1½"	none	2	926716A
40CN110AVPKG244	180	3.5 bar	G1½"	none	10	926836A
40CN202AVPKG244	280	3.5 bar	G1½"	none	2	926717A
40CN210AVPKG244	280	3.5 bar	G1½"	none	10	926838A
80CN102APVKG324	370	3.5 bar	G2"	none	2	932659A
80CN110APVKG324	370	3.5 bar	G2"	none	10	932661A
80CN202AVPKG324	530	3.5 bar	G2"	none	2	932665A
80CN210AVPKG324	530	3.5 bar	G2"	none	10	932667A

Part Number	Flow L/min	Micron Rating	Bypass	Ports	Micron Rating Bx(c)>200	Replacement Element Part Numbers
EPF1102AIBPMG081	40	2	7 bar	G½"	2	944418A
EPF1110AIBPMG081	40	10	7 bar	G½"	10	944420A
EPF2202AIBPMG121	140	2	7 bar	G¾"	2	944430A
EPF2210AIBPMG121	140	10	7 bar	G¾"	10	944432A
EPF3202AIBPMG161	250	2	7 bar	G1"	2	944438A
EPF3210AIBPMG161	250	10	7 bar	G1"	10	944440A
EPF4202AIBPMG201	450	2	7 bar	G1¼"	2	944446A
EPF4210AIBPMG201	450	10	7 bar	G1¼"	10	944448A
EPF5102AIBPMG241	500	2	7 bar	G1½"	2	944450A
EPF5110AIBPMG241	500	10	7 bar	G1½"	10	944452A

Product Selection

The pressure drop of the Parker Static Control Media is comparable with the equivalent Microglass III micron rating.

Other products with Parker Static Control Media are available on request

Pressure drop information can be obtained by free registration on www.filterselector.com

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Catalogue FDHB 812 UK/UK-INT'L 08/2012-TMCZ

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