A clean start is essential

Cleanliness Services

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

Parker

ENGINEERING YOUR SUCCESS.

Profitability starts with clean components

Parker Cleanliness Services

Modern equipment calls for profitable and reliable operation. In general more attention is given to the system cleanliness level once the machine or installation is assembled. The fluid cleanliness level is often expressed in accordance to ISO4406:1999 or NAS 1638.

Contamination present in new or modified system components have a significant impact on the amount of build-in contamination. This build-in contamination does not only shorten the life time of other system components due to wear and tear processes, it also represents high cost associated with flushing new build, or modified, systems to achieve the required cleanliness level.

Parker Filtration supports OEM's and system builders to define and measure the cleanliness level of system components in accordance to ISO 16232 or VDA 19

Parker Cleanliness Services is about

- Analysis of the component cleanliness level
- Analysis of hydraulic and lubrication fluids
- Analysis of filters and filter elements

Over 80% of system failure is due to contamination, we introduce a service to analyze the cleanliness level of system components

Manufacturing and flushing processes of system components can be improved by frequent validation the cleanliness level against ISO ISO 16232 or VDA 19. Monitoring the development of the cleanliness level supports the capability of the supply of systems components meeting the OEM or system builder cleanliness requirements.

Parker Filtration in Arnhem, The Netherlands, offers a commercial service to validate the cleanliness level of components. This dedicated unit includes a cabinet with a conditioned environment for optimal analysis of the components.

How does it work?

- System component is placed in a cleaned cabinet
- The component is pressure rinsed with a clean flushing fluid
- The flushing fluid is collected and filtered using a 5 micron membrane
- After drying the weight of the contaminated membrane is measured and compared with a clean membrane
- A microscope scans the membrane, by polarizing the light the unit can discriminate between metallic and non-metallic particles
- Visual analysis of the membrane by microscope is performed
- A report is generated reporting the cleanliness in accordance to the ISO 16232 or VDA 19 standard

Pressure rinsing of manifold block

Pressure rinsing of hydraulic hose

Achieving lower cost of manufacturing by introducing control of component's cleanliness levels

The report includes:

- The number of metallic particles and corresponding distribution of sized
- The number of non-metallic particles and corresponding distribution of sized
- The largest and smallest particle measured
- Detailed pictures of the contamination
- Largest fiber measured

Cleanliness level control is more than reporting only

Following the Lean manufacturing principle of continuous improvement, our cleanliness services provides reports and recommendations that can be used to:

- Verify the existing cleanliness level of components against international accepted standards
- Supports initiatives to improve the manufacturing and flushing processes of new components and how it impacts the cleanliness level of system components

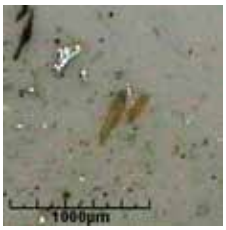
Prevent future failure of system components by defining target cleanliness levels and frequent validation if these are met.

Report in accordance to ISO 16232 : Example of images

Largest metallic particle
660 µm x 229 µm

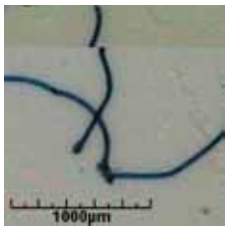
Second largest metallic particle
644 µm x 177 µm

Largest nonmetallic particle
542 µm x 121 µm



Second largest nonmetallic particle
387 µm x 76 µm

Membrane overview



Largest fiber:
L = 2072 µm

Parker Hannifin Manufacturing Netherlands (Filtration) B.V
Filter Division Europe
Stieltjesweg 8, 6827 BV Arnhem, Holland
P.O Box 5008, 6802 EA Arnhem, Holland
Tel: +31 26 376 0 376, Fax: +31 26 364 3 620

Cleanliness Analysis according to ISO 16232

Description of sample			
Component:	8-8F42EDMLOS	Date of Extraction:	
Comp. No.:	8-8F42EDMLOS Sample 3	Examiner:	G.Cloosterman
Sample No.:	R0473	Date of Analysis:	12-12-2013
Customer:	Parker Hannifin Italy SRL		

Extraction			
Method:	Pressure rinsing	Components on filter:	1
Liquid:	Haku 1025-920	Comp. Surface [cm²]:	1,256
Amount [L]:	0.5 l	Filter Type:	5µm Cellulose Nitrate filter
Weight [mg]:	4,80mg		

Microscopic Analysis			
Scale:	X:6,3 µm/Pxl Y:6,3 µm/Pxl	Eval. Diameter [mm]:	44

Largest metallic particle	Length [µm]:	660	Width [µm]:	229
Largest nonmetallic particle[1]	Length [µm]:	542	Width [µm]:	121

Length of largest fiber[2] [µm]:	2072	Total length of fibers[2] [mm]:	27,48

		Particle count[1] on membrane		Particle count[1] per sample		Particle count[1] per 1000 cm²	
Particle size [µm]	Code	Total[1]	Metallic	Total[1]	Metallic	Total[1]	Metallic
Summarized results:							
> 600	J-K	3	3	3,0	3,0	2388,5	2388,5
100 - 600	F-I	420	141	420,0	141,0	334394,9	112261,1
15 - 100	C-E	9913	1652	9913,0	1652,0	7892515,9	1315286,6
Detailed results:							
> 1000	K	0	0	0,0	0,0	0,0	0,0
600 - 1000	J	3	3	3,0	3,0	2388,5	2388,5
400 - 600	I	8	7	8,0	7,0	6369,4	5573,2
200 - 400	H	71	28	71,0	28,0	56528,7	22293,0
150 - 200	G	89	25	89,0	25,0	70859,9	19904,5
100 - 150	F	252	81	252,0	81,0	200636,9	64490,4
50 - 100	E	1254	410	1254,0	410,0	998407,6	326433,1
25 - 50	D	4051	799	4051,0	799,0	3225318,5	636146,5
15 - 25	C	4608	443	4608,0	443,0	3668789,8	352707,0
5 - 15	B	14394	270	14394,0	270,0	11460191,1	214968,2

CCC[1] (Component Cleanliness Code):

A(B24/C-E23/F-I19/J-K12)
A(B24/C22/D22/E20/F18/G17/H16/I13/J12/K00)

[1]: Particles without fibers
[2]: Definition fiber: Nonmetallic, Compactness < 30% or Length/Width > 10.

System performance does not rely on luck
Best practice for reducing cost of ownership

Depending on the circumstances, up to 80% of system failure is caused due to contamination. For those applications were continuous analysis of the fluid cleanliness level is not implemented, Parker offers extended laboratory services to support quick validation of the hydraulic fluid condition. In addition to this, our analysis provides an indication of the system's health.

Hydraulic fluids are selected based on their unique performance with regard to:
- Energy transfer
- Protection against corrosion
- Cooling
- Sealing
- Lubrication

System safety and efficiency are directly influenced by the condition of the hydraulic fluid. Frequent validation of the hydraulic fluid's condition is not always in place by means of standard work procedures, regularly judging the usability of the oil. How can we help?

Parker's cleanliness services replaces good luck by best practices and facts. Because safety and reliability should not depend on assumptions

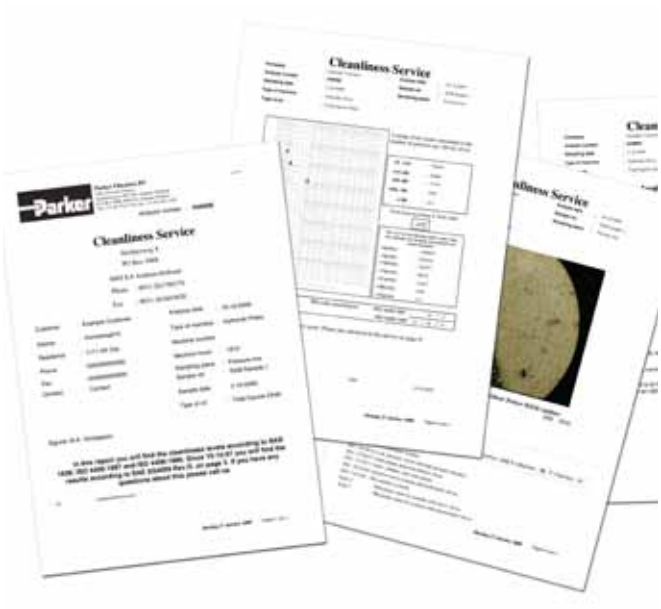
Lifetime of hydraulic and lubrication fluids is continuously influenced by the amount of oxygen, oil temperature, water content and presence of catalyser type elements. The effects of static electricity causes additional impact to the fluid's life time. In some occasions various oil types are mixed. With all uncertainties in place about the usability of the oil, introducing best practice for oil analysis is worth to consider!
Frequent analysis of the hydraulic fluids enables users of equipment to perform trend analysis. With trend analysis we can avoid system failure and damage to the environment.

By introducing frequent hydraulic fluid analysis, Parker Filtration is able to provide information about:

- Hydraulic Fluid Cleanliness Level
- Hydraulic Fluid Water Content
- Fluid viscosity and viscosity index
- Chemical composition

Fast turnaround: Test results are provided within 72 hours after receiving your fluid sample on regular working days. For Spectro-chemical analysis detailed report is provided within 7 days.

How to implement Best Practice for system safety and efficiency:



Parker provides fluid sample kits including the pre-cleaned and sealed sample bottle. This bottle is supplied with a reusable mailing container with pre-adressed label. Information about how to take a hydraulic fluid sample is included.
The Parker sample kit allows the end user to select the desired analysis package. For every fluid analysis made by Parker, a complete report is provided by e-mail including information about:

- Cleanliness level expressed in ISO, NAS and SAE AS4059 Rev. D code
- Water content expressed in ppm
- Viscosity at 40°C and 100°C and viscosity index
- TAN (total acid number)
- Spectrochemical analysis of over 20 wear metals and additives

Oil analysis packages

Option	Reference code	Sample bottle included	Scope of analysis
1	6084000001	Yes	Particle count/Membrane/Water content/Microscopic photo
2	6084000006	Yes	Particle count/Membrane/Spectro-chemical/Water content/Microscopic photo
Option	**Reference code**	**Sample bottle included**	**Scope of supply**
A	6084000000	Yes	Empty bottle kit

Country	E-mail	Phone
The Netherlands	parker.nl@parker.com	+31(0) 541 585 000
Germany	parker.germany@parker.com	+49(0) 213 140 160
France	parker.france@parker.com	+33(0) 450 258 025
Belgium	parker.belgium@parker.com	+32(0) 672 809 00
Denmark	parker.denmark@parker.com	+45 435 60 400
Italy	parker.italy@parker.com	+39 024 51 921
Spain	parker.spain@parker.com	+34 902 330 001
Austria	parker.austria@parker.com	+43(0) 262 223 501-0
Czech Republic	parker.czechrepublic@parker.com	+420 284 083 111
Parker Filtration	HFTC@parker.com	+31(0) 263 760 376

Oil analysis packages

The analysis of used filter elements is beneficial to tailor the performance of the filter in accordance to the system requirements.

Used filter elements can be investigated to determine the remaining life time. In addition to this, this analysis can provide information about the type of contamination present in the system and the condition of the oil.

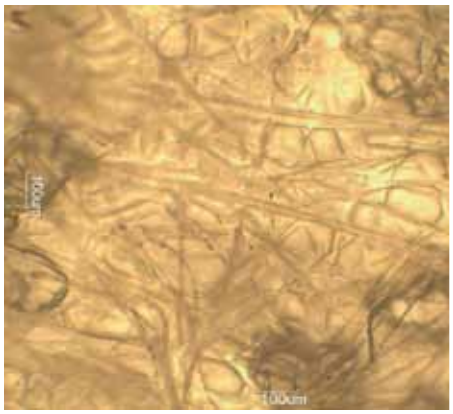
For this analysis a small part of the pleatpack is removed from the filter element. This small part of the pleatpack is submerged in white spirit while ultrasonic waves are applied to remove the contamination. Than the weight of the contamination sepated from this small part is weighed and a calculation is made to determine the total amount of contamination removed by the filter.

The report provides:

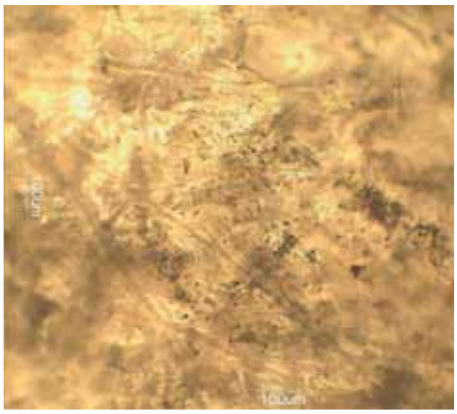
- Data about the amount of contamination removed by the filter from the system
- Remaining life time of the filter element
- Pictures of the filter layer(s) to visualize the structure of the filter material and contamination
- Conclusion about the usability of the filter element and recommendations

Element type		TPR210QLBP2S05		
QA Number		QA:B2409 Element A2209		
Requested analysis		Fisical after 1328 hrs in use		
Visual inspection		Complete TPR filter with LEIF element.		
Colour code correct Yes/No				
Fisical inspection				
Number of pleats(N1)	32			
Eff. Height of pleats(H1)	18,3	Total area of the pleatpack:	1073,60	cm□
Take a part of the element				
Number of pleats taken(N2)	3	Area taken:	19,25	cm□
Length of this part(L1)	5,5			
Width of this part(H2)	3,5			
Weight of the contamination(G)	0,05051	Gramm (60%)		
Total weight of the contamination in the element			4,69	Gramm
Element blocked Yes/No	No			
Mikroscopical inspection				
Remarks and conclusion.	The element is taken apart and checked for the correct assembly. The identification lines were missing. A small part of the pleatpack is submerged in white spirit while ultrasonic waves are applied. The weight of the contamination separated from this small part is weighed and a calculation is made to determine the total amount of contamination trapped by the element. Photographs are made from the seperate filterlayers and the residu from the separation. The weight of the contamination is approx.4,7 gramm.The nominal DHC is 20,3 gramm. The filter is practicaly clean with 23,15 % of its lifetime used.			

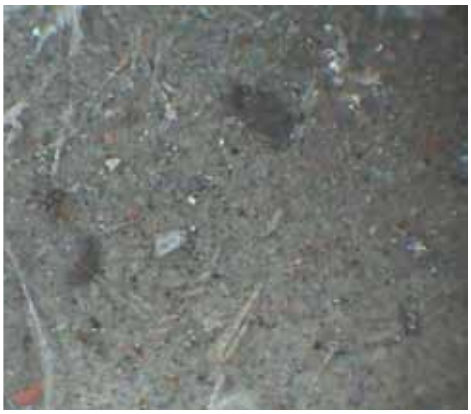
Photograph of pre-filter with backlight



Photograph of main-filter with backlight



Photograph of contamination separated from element



Continuous validation of oil cleanliness level and it's condition

Parker Filtration provides a wide variety of sensors of the continuous, or dis-continuous measurement of the fluid cleanliness level.

Particle counters using laser technology are applied for the validation of the fluid cleanliness level against ISO4406:1999 or NAS 1638. These particle counters can be connected to the system for continuous measurement or are available as portable devices.

The icountPDR is a robust particle counter developed for mobile applications

The portable icountOS is ideal for quick validation of the fluid cleanliness and moisture level. For more in-depth analysis of the oil Parker's Cleanliness Services offers laboratory based validation of the condition of the oil, the moisture and cleanliness level.

Metal wear debris measurement is applied in a wide variety of heavy duty industries. Our proven MWDS sensors are applied to measure continuously the wear debris in critical systems like thrusters and wind turbine gear boxes.

Our oil quality sensors provides continuous information about the aging of the hydraulic or lubrication fluid, ensuring that system damaged can be avoided once the fluid requires replacement

For quick analysis in the field our DIGI kits provides information about the condition of the oil and the presence of moisture and important wear element

Robust particle counter type IcountPDR

Portable particle counter type IcountOS

Field test kit for oil analysis type DIGIkit

Metal wear debris sensor type MWDS

Parker Worldwide

Europe, Middle East, Africa

AE – United Arab Emirates, Dubai
Tel: +971 4 8127100
parker.me@parker.com

AT – Austria, Wiener Neustadt
Tel: +43 (0)2622 23501-0
parker.austria@parker.com

AT – Eastern Europe, Wiener Neustadt
Tel: +43 (0)2622 23501 900
parker.easteurope@parker.com

AZ – Azerbaijan, Baku
Tel: +994 50 2233 458
parker.azerbaijan@parker.com

BE/LU – Belgium, Nivelles
Tel: +32 (0)67 280 900
parker.belgium@parker.com

BY – Belarus, Minsk
Tel: +375 17 209 9399
parker.belarus@parker.com

CH – Switzerland, Etoy
Tel: +41 (0)21 821 87 00
parker.switzerland@parker.com

CZ – Czech Republic, Klecany
Tel: +420 284 083 111
parker.czechrepublic@parker.com

DE – Germany, Kaarst
Tel: +49 (0)2131 4016 0
parker.germany@parker.com

DK – Denmark, Ballerup
Tel: +45 43 56 04 00
parker.denmark@parker.com

ES – Spain, Madrid
Tel: +34 902 330 001
parker.spain@parker.com

FI – Finland, Vantaa
Tel: +358 (0)20 753 2500
parker.finland@parker.com

FR – France, Contamine s/Arve
Tel: +33 (0)4 50 25 80 25
parker.france@parker.com

GR – Greece, Athens
Tel: +30 210 933 6450
parker.greece@parker.com

HU – Hungary, Budapest
Tel: +36 1 220 4155
parker.hungary@parker.com

IE – Ireland, Dublin
Tel: +353 (0)1 466 6370
parker.ireland@parker.com

IT – Italy, Corsico (MI)
Tel: +39 02 45 19 21
parker.italy@parker.com

KZ – Kazakhstan, Almaty
Tel: +7 7272 505 800
parker.easteurope@parker.com

NL – The Netherlands, Oldenzaal
Tel: +31 (0)541 585 000
parker.nl@parker.com

NO – Norway, Asker
Tel: +47 66 75 34 00
parker.norway@parker.com

PL – Poland, Warsaw
Tel: +48 (0)22 573 24 00
parker.poland@parker.com

PT – Portugal, Leca da Palmeira
Tel: +351 22 999 7360
parker.portugal@parker.com

RO – Romania, Bucharest
Tel: +40 21 252 1382
parker.romania@parker.com

RU – Russia, Moscow
Tel: +7 495 645-2156
parker.russia@parker.com

SE – Sweden, Spånga
Tel: +46 (0)8 59 79 50 00
parker.sweden@parker.com

SK – Slovakia, Banská Bystrica
Tel: +421 484 162 252
parker.slovakia@parker.com

SL – Slovenia, Novo Mesto
Tel: +386 7 337 6650
parker.slovenia@parker.com

TR – Turkey, Istanbul
Tel: +90 216 4997081
parker.turkey@parker.com

UA – Ukraine, Kiev
Tel +380 44 494 2731
parker.ukraine@parker.com

UK – United Kingdom, Warwick
Tel: +44 (0)1926 317 878
parker.uk@parker.com

ZA – South Africa, Kempton Park
Tel: +27 (0)11 961 0700
parker.southafrica@parker.com

North America

CA – Canada, Milton, Ontario
Tel: +1 905 693 3000

US – USA, Cleveland
Tel: +1 216 896 3000

Asia Pacific

AU – Australia, Castle Hill
Tel: +61 (0)2-9634 7777

CN – China, Shanghai
Tel: +86 21 2899 5000

HK – Hong Kong
Tel: +852 2428 8008

IN – India, Mumbai
Tel: +91 22 6513 7081-85

JP – Japan, Tokyo
Tel: +81 (0)3 6408 3901

KR – South Korea, Seoul
Tel: +82 2 559 0400

MY – Malaysia, Shah Alam
Tel: +60 3 7849 0800

NZ – New Zealand, Mt Wellington
Tel: +64 9 574 1744

SG – Singapore
Tel: +65 6887 6300

TH – Thailand, Bangkok
Tel: +662 186 7000-99

TW – Taiwan, Taipei
Tel: +886 2 2298 8987

South America

AR – Argentina, Buenos Aires
Tel: +54 3327 44 4129

BR – Brazil, Sao Jose dos Campos
Tel: +55 800 727 5374

CL – Chile, Santiago
Tel: +56 2 623 1216

MX – Mexico, Apodaca
Tel: +52 81 8156 6000

Catalogue FDHK831UK

EMEA Product Information Centre
Free phone: 00 800 27 27 5374
(from AT, BE, CH, CZ, DE, DK, EE, ES, FI, FR, IE, IL, IS, IT, LU, MT, NL, NO, PL, PT, RU, SE, SK, UK, ZA)

US Product Information Centre
Toll-free number: 1-800-27 27 537

Your local authorized Parker distributor