HIGH PERFORMANCE OIL FILTERS FOR V8 ROVER ENGINES















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OBJECTIVES

- 1. Dramatically reduce circulation of engine damaging solid contamination
- 2. Improve engine reliability & longevity
- 3. Extend oil drain & filter change frequency
- 4. Extend frequency between Engine rebuilds
- 5. Quantify the <u>SAVINGS!!</u>

MILLERS OIL RECENTLY STATED...

"YOU SHOULD FIT A QUALITY BRAND FILTER EVERY OIL CHANGE...

...ANYTHING SUB 30 MICRONS WILL STILL PASS THROUGH (the filter) – INCLUDING MICROSCOPIC FRAGMENTS OF STEEL."

"ITS JUST NOT POSSIBLE TO MAKE A MORE EFFICIENT STANDARD SIZE FILTER"

WELL... THATS NOT STRICTLY TRUE...









CERBERA RANGE ROVER DISCOVERY <u>TYPICAL ROVER V8 ENGINE FILTER –</u> <u>ERR 3340 TYPE SPIN ON CANISTER</u>

GENERIC PAPER MEDIA PERFORMANCE

10 µm Efficiency0%30 µm Efficiency68%Rated Flow4.76 GPM

Outside diameter - 93mm Overall height - 95mm Recommended Max working temp. - 121°C Bypass valve opening DP 10 PSI Includes Anti Back Flow Disc Filter media is constructed from cellulose (paper)

HIGH PERFORMANCE "V8F 8990"

MICROGLASS MEDIA PERFORMANCE



10 µm Efficiency	73%
30 µm Efficiency	100%
Rated Flow	14.27 GPM

Outside diameter - 93mm Overall length - 137mm (42mm longer for capacity) Recommended Max working temp. 121°C Bypass valve opening DP 10 PSI Includes Anti Back Flow Disc Filter media is constructed from "Microglass" or "Dualglass"

LETS COMPARE THOSE FIGURES AGAIN...

PAPER FILTER MEDIA

MICROGLASS MEDIA

10 μm Efficiency0%30 μm Efficiency68%Rated Flow4.76 GPM

10 μm Efficiency73%30 μm Efficiency100%Rated Flow14.27 GPM





FILTER MEDIA TYPES – PAPER

PAPER (CELLULOSE) FILTER MEDIA – ("NOMINAL" RATING):-

Loose non-bonded Paper construction. Weak non supported fibres move under pulsations & high DP, (causes unloading of previously captured debris back into circulation). Fibres swell and break up when moisture is present in oil. <u>Single layer</u> filter media pack.

Large diameter fibres waste filter area and dirt holding capacity (D.H.C) purely with its own bulky construction.



FILTER MEDIA TYPES – MICROGLASS

MICROGLASS MEDIA - ("ABSOLUTE" RATING):-

Strong, fine epoxy bonded glassfibre strands. Dense filter mat is supported by further layers of mat & fine steel mesh (<u>5 layers</u>).

The 5 layer filter mat is rigid and unaffected by pulsations, high delta P and moisture. It does NOT "unload" previously captured debris back into circulation under shock conditions.

Finer fibres result in more "voids" to be blocked with debris hence higher D.H.C.

More voids also = higher flow capabilities.



THE 5 LAYER MEDIA STRUCTURE



OBJECTIVE:- REDUCE CIRCULATION OF ENGINE

DAMAGING CONTAMINATION

CERBERA – 5ml SAMPLE "PATCH TEST" OF ORIGINAL ENGINE OIL CLEANLINESS HAVING USED A PAPER MEDIA FILTER ELEMENT



Oil cleanliness beyond ISO Oil Cleanliness Classification



AFTER 2000 MILES WITH HIGH PERFORMANCE V8F 8990 FILTER



Conspicuously lower levels of debris. Very few metallic particles of over 10 micron in size were observed. ISO Code 15/12

ORIGINAL ENGINE OIL CLEANLINESS - DISCOVERY

Sample Qty. 5ml.

Mag. 100x



Note metallic particles (slivers & platelets), silica and fibres. Silica (sand from Sahara) has a hardness of MOH 8. Some of the particles (metallic wear debris) are >100 microns in size.

Oil cleanliness is ISO Cleanliness Code 24/21



AFTER 1200 MILES WITH V8F 8990 FILTER



Again huge improvement in oil cleanliness. Very few particles of over 10 micron in size were observed. ISO Code 15/12



AFTER 2400 MILES WITH V8F 8990 FILTER





4000 MILES WITH V8F 8990 FILTER





8000 MILES WITH V8F 8990 FILTER





10,000 MILES WITH V8F 8990 FILTER





11,000 MILES WITH V8F 8990 FILTER





12,000 MILES WITH V8F 8990 FILTER



DISCOVERY OIL COLOUR...









ORIGINAL ENGINE OIL CLEANLINESS – RANGE ROVER





AFTER 2000 MILES WITH V8F 8990





AFTER 9000 MILES WITH V8F 8990



OIL CLEANLINESS LEVELS

Oil cleanliness is classified to ISO Spec. 4406.

In this form oil cleanliness is summarised as convenient "Range Numbers" that declare number of particles per millilitre of fluid. For example: ISO CODE 24/21 was the cleanliness of the Discovery oil with the original paper filter.

ISO CODE 15/12 was resultant cleanliness... and typical of we would expect for your engines running with fine glassfibre filters.

As you can well imagine – the higher the numbers, the more contamination in the fluid.

Resultant oil cleanliness was 9 ISO Codes lower – that's 512 times less contamination than at the start!

SIZE DOES MATTER ...!

Solid Contamination

Irregular shaped particles

Very few are large enough to see



Size		Count No./ml Example Hydraulic Example		Size	Detectibility	
Microns*	Inches**	System	Öil	Equivalent	Range	
3	0.00012	4955	10360	Bacteria	Electron Microscope	
5	0.0002	2580	5840	Red Blood Cells		
10	0.0004	715	1836	Talcum Powder	Microscope	
20	8000.0	125	360	White Blood Cells		
40	0.0016	14	50	Floor Dust		
80	0.0032	1	8	Human Hair Diameter		
120	0.0048	0	2	Grain of Salt	Naked	
160	0.0064	0	0	Mist	Eye	
200	0.008	0	0	Beach Sand		
*micr	ons=microm	eters	**1 incl	n=25,400 microns		

70 million particles of 3 micron, 35 million 5 micron, 10 million, 10 micron, 2 million 20 micron and 300,000 40 micron particles.

Total: over 117 million particles in a V8 sump!!

DYNAMIC CLEARANCES IN OUR ENGINES

<u>Component</u>

- Roller Element Bearing
- Journal Bearing
- Gears
- Big End Bearings

Clearance(µm)

0.1-1 0.5-50 0.1-1 0.5-25 **DYNAMIC CLEARANCES ON BIG END BEARINGS**



OBJECTIVE:- EXTEND FREQUENCY BETWEEN ENGINE REBUILDS

AB	2	3	4	5	6	7	8	9	10
26/23	22/19	20/17	18/15	17/14	16/13	15/12	15/12	14/11	14/11
25/22	21/18	19/16	17/14	16/13	15/12	14/11	14/11	13/10	13/10
24/21	20/17	18/15	17/14	16/13	15/12	14/11	13/10	13/10	12/9
23/20	19/16	17/14	15/12	14/11	13/10	13/10	12/9	11/8	11/8
22/19	18/15	16/13	14/11	13/10	12/9	11/8	11/8		-
21/18	17/14	15/12	13/10	12/9	11/8	11/8	-		-
20/17	16/13	14/11	13/10	11/8				-	-
19/16	15/12	13/10	11/8	-				-	1000-
18/15	14/11	12/9	- X	-	•	-		-	-
17/14	13/10	11/8	-	-	-		-	-	- 1. S. S. S
16/13	12/9	-	-	-		-		-	-
15/12	11/8	-	-	1	-	-	-	-	-
14/11	11/8 ⁽¹⁾		-	1	-			-	
13/10	11/8 ⁽²⁾	· ·	-		-	-		- 1.	-
12/9	11/8⁽³⁾			-		-	and the second second		-

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DIAGNETICS

OBJECTIVE:- QUANTIFY THE BENEFITS...

I'm led to believe that rebuilds of high performance V8 engines are necessary every 5000 hours or so at a cost of around £6000

By reducing oil cleanliness from ISO Code 24/21 to 15/11 there will be an engine life extension factor of at least 6.

So, instead of a 5000 hour rebuild frequency this can be in excess of 30000 hours + .

That's 6 rebuilds and £36,000 with a paper filter...

Or <u>MAYBE..</u> ONE rebuild with a microglass filter.

RESULT - <u>£30,000 SAVING !!</u>



Suitable for the following:

ANY "CLASSIC" ROVER V8 ENGINE THAT USES THE FILTER PART No. ERR 3340 (SPIN ON CANISTER TYPE FILTER

- 3.5 V8
- 3.9 V8
- 4.0 V8
- 4.6 V8



DISCO OIL - BEGINNING OF TRIAL WITH ORIGINAL PAPER FILTER



DISCO OIL AFTER 12,000 MILES WITH V8F 8990 MICROGLASS FILTER



BEFORE

AFTER

YOUR CHOICE !!

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