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15 January 2018

~5x increase in engine lifespan

At 20,607 km a 2015 1.3 L (alloy engine) Yaris 5 door hatch was treated with Xcelplus Engine Treatment.

After treatment with Xcelplus engine wear was reduced by an average of 82 % (measured at 50,865 km): This is 1/5 normal wear and is equivalent to a ~5x increase in engine lifespan N.B. The primary wear metal in alloy engines is iron, followed by aluminium and copper.

Table 1 Reduction in wear

Metals	ppm			
	20,607 km	50,865 km	Change	%
Iron (Fe)	22	4	-18	-82
Copper (Cu)	11	1	-10	-91
Aluminium (Al)	7	3	-4	-57
Chromium (Cr)	0	0	n/a	n/a
Tin (Sn)	2	0	-2	-100
Nickel (Ni)	2	0	-2	-100
Lead (Pb)	1	0	-1	-100
Total	45	8	-37	-82
Viscosity @ 100 °C	14.90	16.76	+1.9	+13
Viscosity @ 40 °C	112.00	134.00	+22	+20

N.B. The Viscosity Variance Report showed improved oil quality.

Table 2 Oil and filter changes

Mileage	Comments
10,332 km	Oil change
20,607 km	First oil sample: Xcelplus added
30,622 km	Second oil sample
40,988 km	Third oil sample
50,865 km	Fourth oil sample

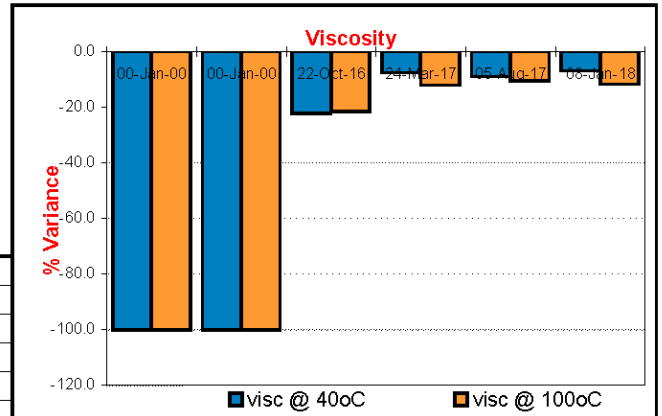


Figure 1 Yaris 2015 white 1.3 L 5 door hatch

N.B. Raised silicon (dirt) levels in the oil analysis correspond to driving on dirt roads in the country: The air filter was changed three times to ensure the problem was not a faulty filter. Dirt particles in the oil are one of the main causes of wear in an engine but after treatment with Xcelplus wear was reduced by an average of 82 %.

TECHNICAL ADVANCE FOR ECONOMIC GAIN

Wear Metal Report: 356,546
Client: MICHAEL CZAJKA
Attention:
Machine: TOYOTA YARIS **ID No:** 1FD1FN
Oil Name: SYNTECH SEMI SYN15W50
Visc@40°C: 144 **Visc@100°C:** 19 **TBN:** 0
Compartment: TOYOTA YARIS



Sample Date	0/01/1900	0/01/1900	22/10/2016	24/03/2017	5/08/2017	8/01/2018		
Analysis Date	0/01/1900	0/01/1900	1/11/2016	29/03/2017	8/09/2017	12/01/2018		
Sample no.	0	0	343502	347771	352928	356546		
SMU	0	0	20,607 km	30,622 km	40,988 km	50,865 km		
Oil km	0	0		10,015	10,366	9,877		
Oil Changed	0	0	Yes	Yes	Yes	Yes		
Wear Metals	ppm	ppm	ppm	ppm	ppm	ppm	Caut	High
lead	0	0	1	0	0	0	60	80
iron	0	0	22	7	6	4	75	95
aluminium	0	0	7	4	4	3	10	16
copper	0	0	11	3	1	1	20	30
chromium	0	0	0	0	1	0	10	15
tin	0	0	2	0	1	0	10	15
nickel	0	0	2	0	0	0	10	15
Contaminants								
silicon	0	0	52	40	42	30	20	35
sodium	0	0	4	5	4	3	20	30
Oil Additives								
magnesium	0	0	3	2	2	1	0	0
zinc	0	0	954	749	702	578	0	0
molybdenum	0	0	6	4	1	0	0	0
calcium	0	0	1767	1732	1731	1519	0	0
phosphorous	0	0	0	620	629	554	0	0
boron	0	0	0	0	0	2	0	0
Infra Red								
TBN	0.00	0.00	0.00	0.00	0.00	0.00	-25%	-50%
soot	0	0	1	3	0	0	50	70
glycol%	0	0	0	0	0	0	1	2
water (ppm)	0.00	0.00	0.00	0.00	0.00	0.00	1	2
fuel dilution%	0	0	1	0	0	0	1	2
oxidation	0	0	15	14	17	16	30	40
nitration	0	0	11	10	11	22	30	40
sulphation	0	0	20	19	24	23	30	40
TAN	0.00	0.00	0.00	0.00	0.00	-	0	0

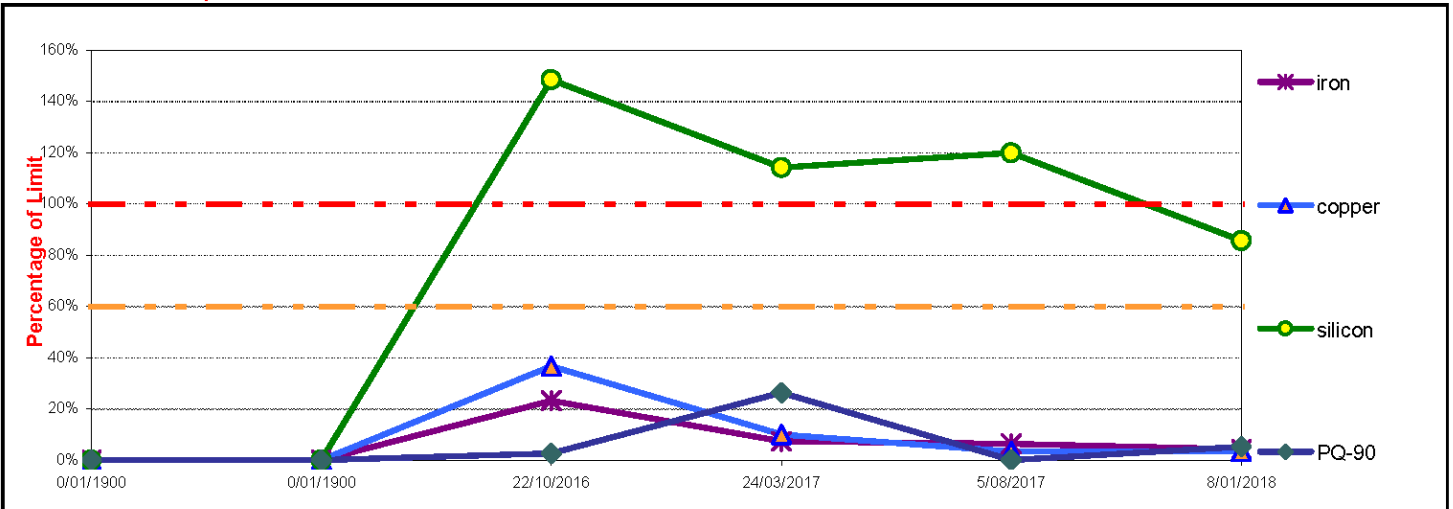
Comments on elevated results

Silicon is elevated at 30ppm. Silicon is a highly abrasive material and can cause accelerated wear. Check air intake system.

Physical Tests	0	0	0	0	0	0	0	0
water %	0	0	0	0	0	0	0	0
PQ-90 mg / ltr	0	0	0	0	0	2	20	38
visc @ 100oC	0.00	0.00	14.90	16.70	17.00	16.76	+10%	+30%
visc @ 40oC	0.00	0.00	112.00	133.00	131.00	134.00	+10%	+30%

Particle Cleanliness Analysis - ISO CODE 4406	
4 µm	-
6 µm	-
14 µm	-
SAE AS 4059 NAS CODE	0

Element Trends Graph



For enquiries, contact: phone: fax: mobile:

This wear analysis and oil condition report should be used in conjunction with normal maintenance and evaluated from sample to sample. Every care will be taken in processing samples but no express or implied guarantee is furnished in regard to the continuing operation or condition of this machinery or any part thereof.