

UIN 0650C4D

Unit No. **Engine**
N####

Unit:
Make Cessna
Model 172P
Serial No.
Site

Compartment:
Name Engine
Make Lycoming
Model O-320
Serial No. 123456
Capacity: Ltrs

Customer:
AVIATION OIL ANALYSIS DEMO
3319 West Earll Drive
Phoenix, AZ 85017
USA

DIAGNOSIS

Please see page 3 & 4 of this report for the MPE wear debris analysis. Generally abnormal to severe rate of wear throughout engine. Silicon level (dirt/sealant material) abnormal. PQ Index number (ferrous material) at a severe level. Viscosity within specified operating range. Action: Inspection for source of wear may be warranted at this time. Resample after corrective action to further monitor.

ANALYST: Quenton.Beals



Severe

LEGEND



Severe



Abnormal



Caution



Normal

DATE SAMPLED	25-Jan-18	02-Dec-17	30-Oct-17	21-Sep-17	12-Aug-17	05-Jul-17
DATE RECEIVED	06-Feb-18	06-Feb-18	06-Feb-18	06-Feb-18	06-Feb-18	06-Feb-18
DATE REPORTED	08-Feb-18	08-Feb-18	08-Feb-18	08-Feb-18	08-Feb-18	08-Feb-18
LAB NO.	44150176882	44150176881	44150176880	44150176879	44150176878	44150176877
SIF NO.	33523916	33523915	33523914	33523909	33523902	33523893
TIME ON UNIT	Hrs					
TIME ON OIL	15	33	31	31	32	30
OIL BRAND	Shell	Shell	Shell	Shell	Shell	Shell
OIL TYPE	AeroShell 100	AeroShell 100	AeroShell 100	AeroShell 100	AeroShell 100	AeroShell 100
OIL GRADE	SAE 50	SAE 50	SAE 50	SAE 50	SAE 50	SAE 50
OIL ADDED						
FILTER	Not Applicable					
OIL CHANGED						
WO NUMBER						

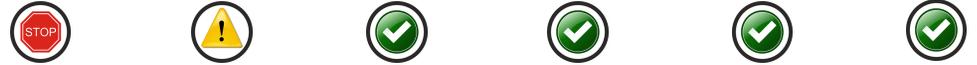
Metals (ppm)						
Aluminium (Al)	33	23	9	7	7	8
Iron (Fe)	256.32	61.58	35.67	29.88	33.15	31.80
Copper (Cu)	33.48	24.13	11.52	9.64	8.31	10.10
Nickel (Ni)	22	20	17	16	13	14
Chromium (Cr)	49	25	16	13	16	15
Tin (Sn)	18	9	4	3	1	2
Lead (Pb)	3209.71	3162.82	3201.56	3143.20	3075.14	3189.26
Silver (Ag)	<1	<1	<1	<1	<1	<1

Contaminants (ppm)						
Silicon (Si)	30	16	7	8	7	7

Additives (ppm)						
Magnesium (Mg)	4	5	3	2	4	3
Calcium (Ca)	12	8	8	11	10	9
Zinc (Zn)	31	30	24	23	25	29
Boron (B)	<5	<5	<5	<5	<5	<5
Phosphorus (P)	18	18	20	17	19	18

Contaminants						
Water (%)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Physical Tests						
Viscosity (cSt 100C)	19.7	18.6	20.0	20.1	19.2	18.4
PQ Index	130	33	<10	<10	<10	<10



UIN 0650C4D

**Aviation Oil Analysis
ALS Tribology**

Phoenix, Arizona

3319 West Earll Drive
Phoenix, AZ 85017
800.445.7930

**ALS Tribology
Other Locations**

USA

Atlanta, Georgia
Kansas City,
Kansas
Portland, Oregon
Sparks, Nevada
Valley View, Ohio

Canada

Burlington, Ontario
Edmonton, Alberta

Australia

Brisbane, Perth,
Sydney, Muswellbrook

Southeast Asia

Kuala Lumpur, Singapore

New Zealand

Wellington

Europe

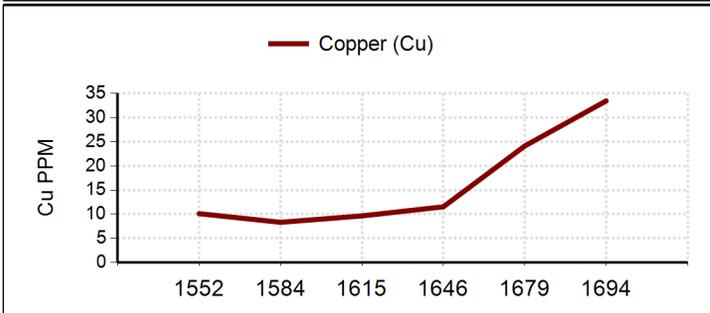
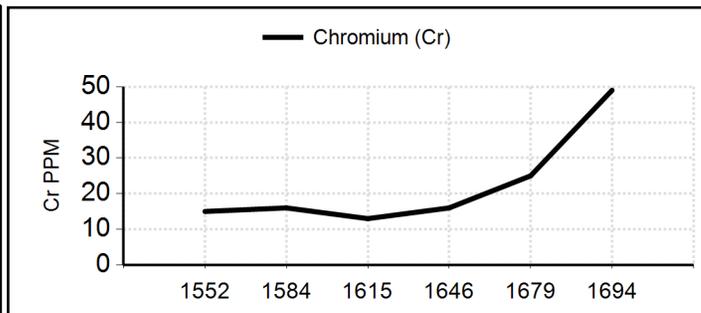
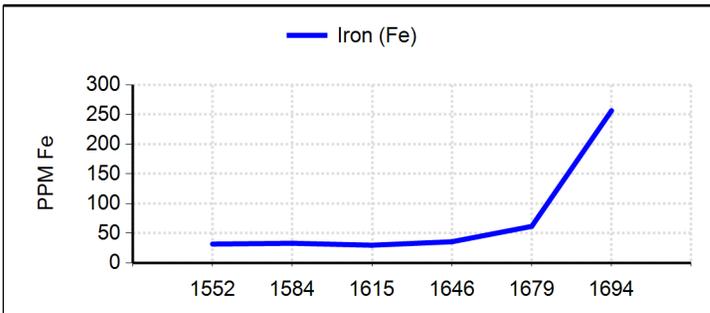
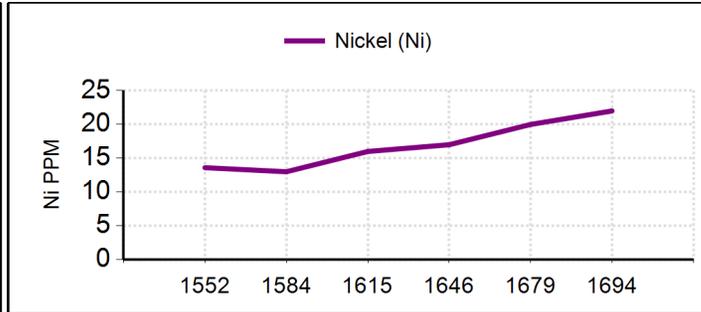
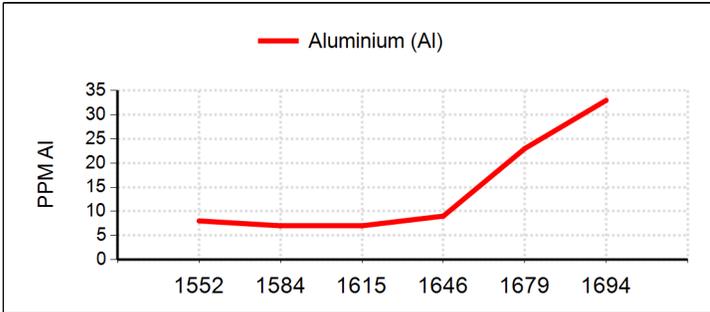
Prague Czech
Republic

South America

Santiago de Chile
Sao Paulo Brazil

Sales & Marketing

Houston, Texas



Filter Image

Filter patch test is not performed Contact laboratory for more information

Since services are based on samples and information supplied by others, and since corrective actions, if any, are necessarily taken by others, these services are rendered without any warranty or liability of any kind beyond the actual amount paid to ALS Tribology for the services. Reported recommendations are based on interpretations of the generated test results and historical data. Certain test results appearing in this report may have been tested at other ALS laboratories within the Tribology divisional network.

Aviation Oil Analysis Demo
Attn: AOA Demo
3319 West Earll Drive
Phoenix, AZ 85017
USA

UIN 0650C4D

MICROSCOPIC PARTICLE EXAMINATION

Unit No.	Engine N#####
Unit:	
Make	Cessna
Model	172P
Serial No.	
Site	
Compartment:	
Name	Engine
Make	Lycoming
Model	O-320
Serial No.	123456
Capacity:	Ltrs

Customer:
AVIATION OIL ANALYSIS DEMO
3319 West Earll Drive
Phoenix, AZ 85017
USA

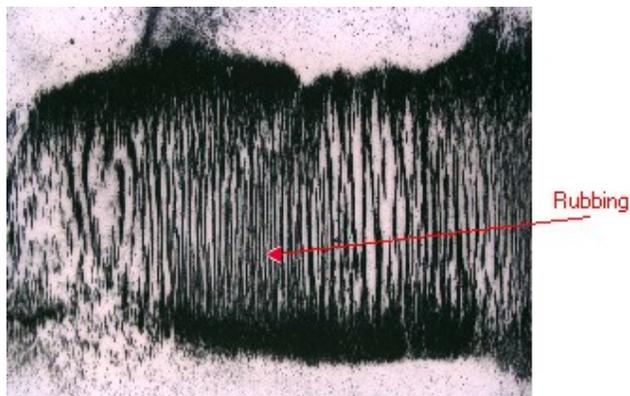
DIAGNOSIS

Microscopic examination shows heavy amounts of rubbing wear (predominantly low alloy steel) and moderate amounts of corrosives (oil additive depletion). Also present were low amounts of black and red oxides, non-ferrous wear (copper particles ranging up to 15 microns), dirt and fibers. Note: sample was prepared with 1/5 the normal amount of fluid used.

Action: Inspection for sources of wear to low alloy steel components may be warranted. Monitor unit for corrosion. Recommend drain and flush system to remove debris and replenish additives, and resample at a reduced interval after corrective action is taken to further monitor and check wear trends.

ANALYST: Jeff.Holl

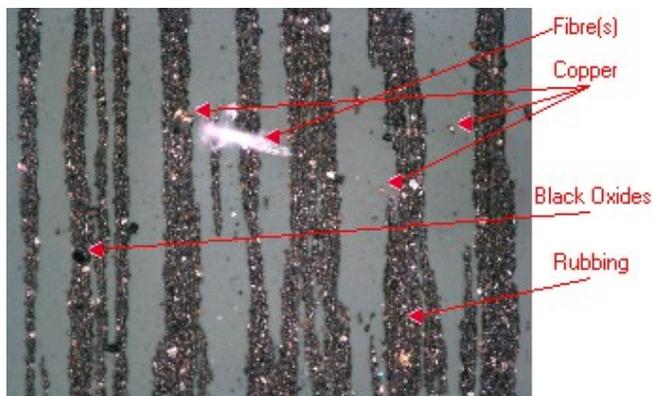
 Severe	LEGEND			
 Severe	 Abnormal	 Caution	 Normal	



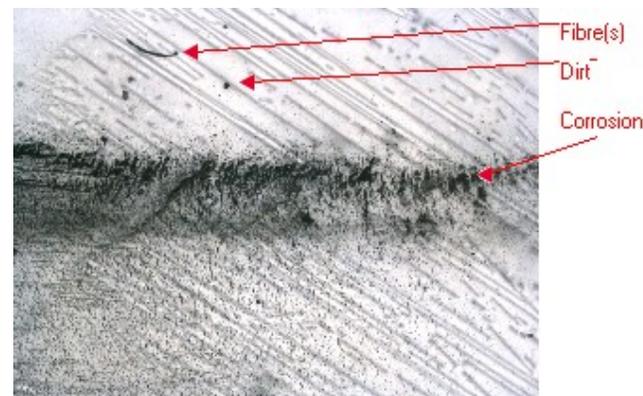
Wear overview/entry/50x



Rubbing/entry/500x



Rubbing/entry/500x



Corrosives/exit/50x

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Brisbane, Perth,
Sydney, Muswellbrook

Southeast Asia

Kuala Lumpur, Singapore

New Zealand

Wellington

Europe

Prague Czech
Republic

South America

Santiago de Chile
Sao Paulo Brazil

Sales & Marketing

Houston, Texas

MICROSCOPIC PARTICLE EXAMINATION



SAMPLE HISTORY

CURRENT

PREVIOUS 1

PREVIOUS 2

PREVIOUS 3

PREVIOUS 4

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LAB N°	44150176882	44150176881	44150176880	44150176879	44150176878
SIF N°	33523916	33523915	33523914	33523909	33523902
COMPONENT	Hrs	Hrs	Hrs	Hrs	Hrs
MACHINE	1694	1679	1646	1615	1584
OIL	15	33	31	31	32
OIL BRAND	Shell	Shell	Shell	Shell	Shell
OIL TYPE	AeroShell 100				
OIL GRADE	SAE 50				
OIL ADDED	Ltrs	Ltrs	Ltrs	Ltrs	Ltrs
FILTER	Hrs	Hrs	Hrs	Hrs	Hrs
OIL CHANGED	Not Applicable				
WO NUMBER					

RATING/SIZING

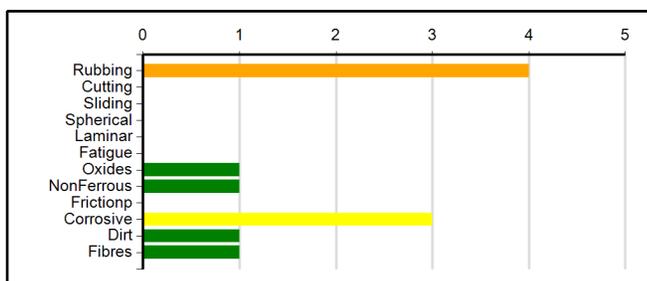
(0=NEGLIGIBLE; 1=FEW; 2=LIGHT; 3=MODERATE; 4=HEAVY; 5=EXCESSIVE)

WEAR MODE

Rubbing	4	<=15µ	0	0	0	0
Cutting	0		0	0	0	0
Sliding	0		0	0	0	0
Spherical	0		0	0	0	0
Laminar	0		0	0	0	0
Fatigue	0		0	0	0	0
Oxides	1	Black/Red	0	0	0	0
Non-Ferrous	1	<=15µ	0	0	0	0
Friction Polymer	0		0	0	0	0
Corrosive	3		0	0	0	0
Dirt	1		0	0	0	0
Fibres	1		0	0	0	0

GRAPHICAL PRESENTATION

CURRENT



LEGEND

- Normal wear for this compartment type
- Caution wear for this compartment type
- Abnormal wear for this compartment type
- Severe wear for this compartment type

PROGRESSIVE

