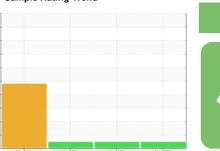


OIL ANALYSIS REPORT

Sample Rating Trend



NORMAL



Machine Id **CONTINENTAL N415LS**

Component
Piston Aircraft Engine

PHILLIPS 66 AVIATION X/C OIL SAE20W50 (---

DIAGNOSIS

Recommendation

Resample at the next service interval to monitor.

All component wear rates are normal.

Contamination

There is no indication of any contamination in the

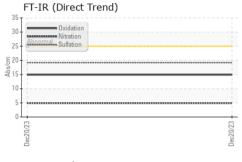
Fluid Condition

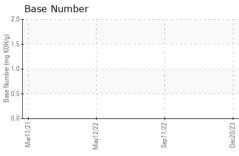
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

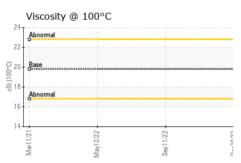
Sample Number Client Info WC0674748 WC0674753 WC0674746 Sample Date Client Info 20 Dec 2023 11 Sep 2022 12 May 2022 15 May 2022 16 M	(GAL)		Mar202	11 May2022	Sep2022 D	ec2023	
Sample Date	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
TSN	Sample Number		Client Info		WC0674748	WC0674753	WC0674746
TSO	Sample Date		Client Info		20 Dec 2023	11 Sep 2022	12 May 2022
Oil Age hrs Client Info 40 79 49 Oil Changed Sample Status Client Info Changed Changed Changed Changed Changed NORMAL	TSN	hrs	Client Info		0	0	0
Changed Changed Changed Changed Changed NORMAL NORMA	TSO	hrs	Client Info		0	1005	925
NORMAL NORMAL NORMAL NORMAL	Oil Age	hrs	Client Info		40	79	49
CONTAMINATION	Oil Changed		Client Info		Changed	Changed	Changed
Fuel	Sample Status				NORMAL	NORMAL	NORMAL
WEAR METALS	CONTAMINATION	١	method	limit/base	current	history1	history2
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >90 43 52 46 Chromium ppm ASTM D5185m >20 6 15 12 Nickel ppm ASTM D5185m >15 <1	Fuel		WC Method	>4.0	<1.0	<1.0	<1.0
	Glycol		WC Method		NEG	NEG	NEG
Chromium ppm ASTM D5185m >20 6 15 12 Nickel ppm ASTM D5185m >15 <1 2 2 Titanium ppm ASTM D5185m >15 <1 2 2 Silver ppm ASTM D5185m >25 0 1 <1 Aluminum ppm ASTM D5185m >25 11 16 12 Lead ppm ASTM D5185m >20000 2121 4647 2748 Copper ppm ASTM D5185m >20000 1 12 11 Copper ppm ASTM D5185m >20 1 3 2 Antimony ppm ASTM D5185m 0 <1 0 <1 0 Vanadium ppm ASTM D5185m 0 <1 0 <1 0 Cadmium ppm ASTM D5185m 0 <1 0 <0 Barium ppm ASTM D5185m	WEAR METALS		method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>90	43	52	46
Description	Chromium	ppm	ASTM D5185m	>20	6	15	12
Silver	Nickel	ppm	ASTM D5185m	>15	<1	2	2
Alluminum	Titanium	ppm	ASTM D5185m		0	<1	0
Lead	Silver	ppm	ASTM D5185m	>5	0	1	<1
Copper ppm ASTM D5185m >25 10 12 11 Tin ppm ASTM D5185m >30 1 3 2 Antimony ppm ASTM D5185m Vanadium ppm ASTM D5185m 0 <1	Aluminum	ppm	ASTM D5185m	>25	11	16	12
Copper ppm ASTM D5185m >25 10 12 11 Tin ppm ASTM D5185m >30 1 3 2 Antimony ppm ASTM D5185m Vanadium ppm ASTM D5185m 0 <1	Lead	ppm	ASTM D5185m	>20000	2121	4647	2748
Tin	Copper		ASTM D5185m	>25	10	12	11
Antimony					1	3	2
Vanadium ppm ASTM D5185m 0 <1 0 Cadmium ppm ASTM D5185m 10 5 5 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 2 4 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 0 <1 <1 Manganese ppm ASTM D5185m <1 1 <1 Magnesium ppm ASTM D5185m 34 14 24 Calcium ppm ASTM D5185m 66 76 101 Phosphorus ppm ASTM D5185m 173 338 320 Zinc ppm ASTM D5185m 18 12 23 Sulfur ppm ASTM D5185m 1906 1730 2234 CONTAMINANTS method limit/base current history1 history2 <	Antimony	ppm	ASTM D5185m				
Cadmium ppm ASTM D5185m 10 5 5 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 2 4 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 0 <1	•	ppm	ASTM D5185m		0	<1	0
Boron ppm ASTM D5185m Q	Cadmium		ASTM D5185m		10	5	5
Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 0 <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 0 <1 <1 Manganese ppm ASTM D5185m <1 1 <1 Magnesium ppm ASTM D5185m 34 14 24 Calcium ppm ASTM D5185m 66 76 101 Phosphorus ppm ASTM D5185m 173 338 320 Zinc ppm ASTM D5185m 18 12 23 Sulfur ppm ASTM D5185m 1906 1730 2234 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 14 13 16 Sodium ppm ASTM D5185m >20 <1 <1 <1 <1 Potassium ppm ASTM D5185m >20 <1 2 2 2 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED	Boron	ppm	ASTM D5185m		0	2	4
Molybdenum ppm ASTM D5185m 0 <1 <1 Manganese ppm ASTM D5185m <1 1 <1 Magnesium ppm ASTM D5185m 34 14 24 Calcium ppm ASTM D5185m 66 76 101 Phosphorus ppm ASTM D5185m 173 338 320 Zinc ppm ASTM D5185m 18 12 23 Sulfur ppm ASTM D5185m 1906 1730 2234 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 14 13 16 Sodium ppm ASTM D5185m >20 <1 <1 <1 <1 Potassium ppm ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % *ASTM	Barium	ppm	ASTM D5185m		0	0	0
Magnesium ppm ASTM D5185m 34 14 24 Calcium ppm ASTM D5185m 66 76 101 Phosphorus ppm ASTM D5185m 173 338 320 Zinc ppm ASTM D5185m 18 12 23 Sulfur ppm ASTM D5185m 1906 1730 2234 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 14 13 16 Sodium ppm ASTM D5185m <1	Molybdenum	ppm	ASTM D5185m		0	<1	<1
Magnesium ppm ASTM D5185m 34 14 24 Calcium ppm ASTM D5185m 66 76 101 Phosphorus ppm ASTM D5185m 173 338 320 Zinc ppm ASTM D5185m 18 12 23 Sulfur ppm ASTM D5185m 1906 1730 2234 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 14 13 16 Sodium ppm ASTM D5185m >15 14 13 16 Sodium ppm ASTM D5185m >20 <1 <1 <1 <1 Potassium ppm ASTM D5185m >20 <1 2 2 2 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2	Manganese	ppm	ASTM D5185m		<1	1	<1
Calcium ppm ASTM D5185m 66 76 101 Phosphorus ppm ASTM D5185m 173 338 320 Zinc ppm ASTM D5185m 18 12 23 Sulfur ppm ASTM D5185m 1906 1730 2234 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 14 13 16 Sodium ppm ASTM D5185m >15 14 13 16 Sodium ppm ASTM D5185m >20 <1	-	ppm	ASTM D5185m		34	14	24
Phosphorus ppm ASTM D5185m 173 338 320 Zinc ppm ASTM D5185m 18 12 23 Sulfur ppm ASTM D5185m 1906 1730 2234 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 14 13 16 Sodium ppm ASTM D5185m >15 14 13 16 Sodium ppm ASTM D5185m >20 <1	-	ppm	ASTM D5185m		66	76	101
Zinc ppm ASTM D5185m 18 12 23 Sulfur ppm ASTM D5185m 1906 1730 2234 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 14 13 16 Sodium ppm ASTM D5185m <1 <1 <1 <1 Potassium ppm ASTM D5185m >20 <1 2 2 2 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624 >20 4.9 Nitration Abs/cm *ASTM D7624 >20 4.9	Phosphorus				173	338	320
Sulfur ppm ASTM D5185m 1906 1730 2234 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 14 13 16 Sodium ppm ASTM D5185m <1	•		ASTM D5185m		18	12	23
Silicon ppm ASTM D5185m >15 14 13 16 Sodium ppm ASTM D5185m <1 <1 <1 <1 Potassium ppm ASTM D5185m >20 <1 2 2 2 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.1 Nitration Abs/cm *ASTM D7624 >20 4.9	Sulfur		ASTM D5185m		1906	1730	2234
Sodium ppm ASTM D5185m <1 <1 <1 <1 <1 <1 <1 <1 <2 2 <2 Value Value ASTM D5185m >20 <1 2 2 2 Value Value Value Value NEG	CONTAMINANTS		method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 <1 2 2 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.1 Nitration Abs/cm *ASTM D7624 >20 4.9	Silicon	ppm	ASTM D5185m	>15	14	13	16
Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.1 Nitration Abs/cm *ASTM D7624 >20 4.9	Sodium	ppm	ASTM D5185m		<1	<1	<1
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.1 Nitration Abs/cm *ASTM D7624 >20 4.9	Potassium	ppm	ASTM D5185m	>20	<1	2	2
Soot % *ASTM D7844 0.1 Nitration Abs/cm *ASTM D7624 >20 4.9	Water	%	ASTM D6304	>0.1	NEG	NEG	NEG
Nitration Abs/cm *ASTM D7624 >20 4.9	INFRA-RED		method	limit/base	current	history1	history2
	Soot %	%	*ASTM D7844		0.1		
Sulfation Abs/.1mm *ASTM D7415 >30 19.2	Nitration	Abs/cm	*ASTM D7624	>20	4.9		
	Sulfation	Abs/.1mm	*ASTM D7415	>30	19.2		



OIL ANALYSIS REPORT

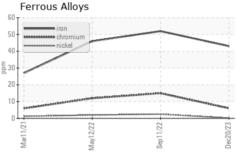


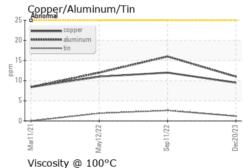


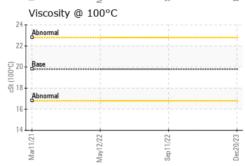


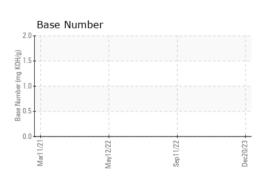
FLUID DEGRADA	TION	method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	*ASTM D7414	>25	14.9		
Base Number (BN)	mg KOH/g	ASTM D2896		1.6		
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE		NONE	NONE
Yellow Metal	scalar	*Visual	NONE		NONE	NONE
Precipitate	scalar	*Visual	NONE		NONE	NONE
Silt	scalar	*Visual	NONE		NONE	NONE
Debris	scalar	*Visual	NONE		NONE	NONE
Sand/Dirt	scalar	*Visual	NONE		NONE	NONE
Appearance	scalar	*Visual	NORML		NORML	MILKY
Odor	scalar	*Visual	NORML		NORML	NORML
Emulsified Water	scalar	*Visual	>0.1		NEG	NEG
Free Water	scalar	*Visual			NEG	NEG
FLUID PROPERT	TES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	19.8	17.43		

GRAPHS













Certificate 12367

Sample No.

: WC0674748 Lab Number : 06149240 Unique Number : 10979318

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received **Tested**

: 15 Apr 2024 : 18 Apr 2024 Diagnosed Test Package : AVI 1 (Additional Tests: FT-IR, KF, TBN)

: 18 Apr 2024 - Jonathan Hester

US 77338 Contact: JOHN TROWBRIDGE fixpain@earthlink.net T: (281)752-1768

JOHN TROWBRIDGE

9816 MEMORIAL BLVD

* - Denotes test methods that are outside of the ISO 17025 scope of accreditation. Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)

To discuss this sample report, contact Customer Service at 1-800-237-1369.

HUMBLE, TX