



OIL REPORT

LAB NUMBER: S141396
REPORT DATE: 11/8/2024
CODE: 63/88

UNIT ID: N52713
CLIENT ID: 67139
PAYMENT: CC: Visa

UNIT MAKE/MODEL: Lycoming IO-360-A1B6D OIL TYPE & GRADE: Phillips XC (A/C) 20W/50
FUEL TYPE: Gasoline (Leaded) OIL USE INTERVAL: 25 Hours
ADDITIONAL INFO: Cessna 177RG "Cardinal", Eng S/N L-27321-51A A/C has aluminum dipstick.

CLIENT BRIAN OSTWINKLE PHONE: (319) 465-5488
MONTICELLO AVIATION FAX: (319) 465-5489
20373 HWY 38 S ALT PHONE:
POB 168 EMAIL: monticelloaviation@qwestoffice.net
MONTICELLO, IA 52310

COMMENTS BRIAN: Thanks for your notes. Hopefully reaming the valve helped with the operational symptom(s) that had you suspecting a stuck valve. Poor wear at exhaust valve stems/guides presents as high levels of nickel, chrome, and iron, and these metals have been looking good for quite some time... but not all problems show up in oil analysis. As far as we can see, though, you caught the problem before any damage was done. Just note for next time that we might find extra metal from the valve work, or from parts wearing in to new clearances afterwards.

ELEMENTS IN PARTS PER MILLION	MI/HR on Oil		UNIT / LOCATION AVERAGES	17		31		36		23		33		UNIVERSAL AVERAGES
	MI/HR on Unit			2,377		2,360		2,329		2,292		2,269		
	Sample Date			5/28/2024		2/12/2024		9/19/2023		4/20/2023		12/13/2022		
	Make Up Oil Added			0.50 qts		4 qts		4 qts		3 qts		4.5 qts		
ALUMINUM	1	5	1	2	1	2	2	2	2	2	2	6		
CHROMIUM	0	1	1	1	1	1	1	1	1	1	1	3		
IRON	5	10	6	9	8	7	9	9	9	9	9	22		
COPPER	2	5	2	3	3	2	3	3	3	3	3	6		
LEAD	1420	2660	1944	2584	1934	1977	2324	3375						
TIN	0	1	1	1	2	1	1	1	1	1	1	1		
MOLYBDENUM	0	0	0	0	0	0	0	0	0	0	0	0		
NICKEL	0	1	0	1	0	0	0	0	0	0	0	2		
MANGANESE	0	0	0	0	0	0	0	0	0	0	0	0		
SILVER	0	0	0	0	0	0	0	0	0	0	0	0		
TITANIUM	0	0	0	0	0	0	0	0	0	0	0	0		
POTASSIUM	0	0	0	0	0	0	0	0	0	0	0	0		
BORON	1	1	1	1	5	1	1	1	1	1	1	1		
SILICON	3	6	4	3	4	4	3	6						
SODIUM	2	1	4	2	3	4	2	1						
CALCIUM	111	51	168	158	133	149	149	31						
MAGNESIUM	1	1	1	1	1	1	1	1						
PHOSPHORUS	70	373	148	123	68	136	119	567						
ZINC	2	4	2	2	3	2	2	3						
BARIUM	0	0	0	0	0	0	0	0						

Values
Should Be*

PROPERTIES	SUS Viscosity @ 210°F	92.4	86-105	85.8	92.7	94.7	92.9	86.1
	cSt Viscosity @ 100°C	18.55	17.0-21.8	16.97	18.64	19.11	18.67	17.04
	Flashpoint in °F	460	>430	455	480	475	465	460
	Fuel %	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5
	Antifreeze %	-	-	-	-	-	-	-
	Water %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Insolubles %	0.3	<0.6	0.4	0.3	0.2	0.4	0.3
	TBN							
	TAN							
	ISO Code							

* THIS COLUMN APPLIED ONLY TO THE CURRENT SAMPLE:

416 E. PETTIT AVE. FORT WAYNE, IN 46806 (260) 744-2380 www.blackstone-labs.com



OIL REPORT

LAB NUMBER: S026608

UNIT ID: N52713

REPORT DATE: 3/1/2024

CLIENT ID: 67139

CODE: 63/88

PAYMENT: CC: Visa

UNIT

MAKE/MODEL: Lycoming IO-360-A1B6D

OIL TYPE & GRADE: Phillips XC (A/C) 20W/50

FUEL TYPE: Gasoline (Leaded)

OIL USE INTERVAL: 31 Hours

ADDITIONAL INFO: Cessna 177RG "Cardinal", Eng S/N L-27321-51A A/C has aluminum dipstick.

CLIENT

BRIAN OSTWINKLE
MONTICELLO AVIATION
20373 HWY 38 S
POB 168
MONTICELLO, IA 52310PHONE: (319) 465-5488
FAX: (319) 465-5489
ALT PHONE:
EMAIL: monticelloaviation@qwestoffice.net

COMMENTS

BRIAN: This Cessna's IO-360 is still checking off all the right boxes. Metals continue to show low and steady engine wear, no contamination is present, and the oil's physical properties are in good shape. Just keep up the good work with this one -- it looks great from our view at 2,359.5 hours SMOH.

ELEMENTS IN PARTS PER MILLION	MI/HR on Oil	31	UNIT / LOCATION AVERAGES	36	23	33	26	30	UNIVERSAL AVERAGES
	MI/HR on Unit	2,360		2,329	2,292	2,269	2,236	2,210	
	Sample Date	2/12/2024		9/19/2023	4/20/2023	12/13/2022	8/15/2022	4/7/2022	
	Make Up Oil Added	4 qts		4 qts	3 qts	4.5 qts	3 qts	4.50 qts	
ALUMINUM	2	5		1	2	2	3	1	6
CHROMIUM	1	1		1	1	1	2	1	3
IRON	9	10		8	7	9	10	7	22
COPPER	3	5		3	2	3	3	3	6
LEAD	2584	2710		1934	1977	2324	2347	2164	3408
TIN	1	1		2	1	1	3	1	1
MOLYBDENUM	0	0		0	0	0	0	0	0
NICKEL	1	1		0	0	1	1	0	2
MANGANESE	0	0		0	0	0	0	0	0
SILVER	0	0		0	0	0	0	0	0
TITANIUM	0	0		0	0	0	0	0	0
POTASSIUM	0	0		0	0	0	0	0	0
BORON	1	1		5	1	1	2	0	1
SILICON	3	6		4	4	3	5	4	6
SODIUM	2	1		3	4	2	3	1	1
CALCIUM	158	47		133	149	149	162	124	30
MAGNESIUM	1	1		1	1	1	1	1	1
PHOSPHORUS	123	386		68	136	119	108	86	573
ZINC	2	4		3	2	2	3	1	3
BARIUM	0	0		0	0	0	0	0	0

Values
Should Be*

PROPERTIES	SUS Viscosity @ 210°F	92.7	86-105	94.7	92.9	86.1	91.3	94.0
	cSt Viscosity @ 100°C	18.64	17.0-21.8	19.11	18.67	17.04	18.30	18.94
	Flashpoint in °F	480	>430	475	465	460	470	465
	Fuel %	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5
	Antifreeze %	-	-	-	-	-	-	-
	Water %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Insolubles %	0.3	<0.6	0.2	0.4	0.3	0.2	0.2
	TBN							
	TAN							
	ISO Code							

* THIS COLUMN APPLIES ONLY TO THE CURRENT SAMPLE

416 E. PETTIT AVE. FORT WAYNE, IN 46806 (260) 744-2380 www.blackstone-labs.com



OIL REPORT

LAB NUMBER: R68637
REPORT DATE: 10/13/2023
CODE: 63/88

UNIT ID: N52713
CLIENT ID: 67139
PAYMENT: CC: Visa

UNIT	MAKE/MODEL: Lycoming IO-360-A1B6D	OIL TYPE & GRADE: Phillips XC (A/C) 20W/50
	FUEL TYPE: Gasoline (Leaded)	OIL USE INTERVAL: 36 Hours
	ADDITIONAL INFO: Cessna 177RG "Cardinal", Eng S/N L-27321-51A A/C has aluminum dipstick.	

CLIENT	BRIAN OSTWINKLE	PHONE: (319) 465-5488
	MONTICELLO AVIATION	FAX: (319) 465-5489
	20373 HWY 38 S	ALT PHONE:
	POB 168	EMAIL: monticelloaviation@qwestoffice.net
	MONTICELLO, IA 52310	

COMMENTS	BRIAN: Nice work with this engine. Metals are low and steady overall, and that's the type of trend we find from healthy engines. There isn't any indication of trouble on the horizon, and there isn't any contamination to point out. Excellent work with this IO-360!	

ELEMENTS IN PARTS PER MILLION	MI/HR on Oil	36	UNIT / LOCATION AVERAGES	23	33	26	30	28	UNIVERSAL AVERAGES
	MI/HR on Unit	2,329		2,292	2,269	2,236	2,210	2,131	
	Sample Date	9/19/2023		4/20/2023	12/13/2022	8/15/2022	4/7/2022	10/25/2021	
	Make Up Oil Added	4 qts		3 qts	4.5 qts	3 qts	4.50 qts	2.5 qts	
	ALUMINUM	1	5	2	2	3	1	2	6
	CHROMIUM	1	1	1	1	2	1	1	3
	IRON	8	10	7	9	10	7	9	22
	COPPER	3	5	2	3	3	3	3	6
	LEAD	1934	2713	1977	2324	2347	2164	2051	3418
	TIN	2	1	1	1	3	1	0	1
	MOLYBDENUM	0	0	0	0	0	0	0	0
	NICKEL	0	1	0	1	1	0	1	2
	MANGANESE	0	0	0	0	0	0	0	0
	SILVER	0	0	0	0	0	0	0	0
	TITANIUM	0	0	0	0	0	0	0	0
	POTASSIUM	0	0	0	0	0	0	0	0
	BORON	5	1	1	1	2	0	0	1
	SILICON	4	6	4	3	5	4	6	5
	SODIUM	3	1	4	2	3	1	2	1
	CALCIUM	133	44	149	149	162	124	140	29
	MAGNESIUM	1	1	1	1	1	1	0	1
	PHOSPHORUS	68	393	136	119	108	86	73	580
	ZINC	3	4	2	2	3	1	3	3
	BARIUM	0	0	0	0	0	0	0	0

Values
Should Be*

PROPERTIES	SUS Viscosity @ 210°F	94.7	86-105	92.9	86.1	91.3	94.0	91.3
	cSt Viscosity @ 105°C	19.11	17.0-21.8	18.67	17.04	18.30	18.94	18.30
	Flashpoint in °F	475	>430	465	460	470	465	455
	Fuel %	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5
	Antifreeze %	-	-	-	-	-	-	-
	Water %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Insolubles %	0.2	<0.6	0.4	0.3	0.2	0.2	0.3
	TBN							
	TAN							
	ISO Code							

* THIS COLUMN APPLIES ONLY TO THE CURRENT SAMPLE

416 E. PETTIT AVE. FORT WAYNE, IN 46806 (260) 744-2380 www.blackstone-labs.com



OIL REPORT

LAB NUMBER: R10731
REPORT DATE: 5/22/2023
CODE: 63/88

UNIT ID: N52713
CLIENT ID: 67139
PAYMENT: CC Online

UNIT	MAKE/MODEL:	Lycorning IO-360-A1B6D	OIL TYPE & GRADE:	Phillips XC (A/C) 20W/50
	FUEL TYPE:	Gasoline (Leaded)	OIL USE INTERVAL:	23 Hours
	ADDITIONAL INFO:	Cessna 177RG "Cardinal", Eng S/N L-27321-51A A/C has aluminum dipstick.		

CLIENT	BRIAN OSTWINKLE	PHONE: (319) 465-5488
	MONTICELLO AVIATION	FAX: (319) 465-5489
	POB 168	ALT PHONE:
	MONTICELLO, IA 52310	EMAIL: monticelloaviation@qwestoffice.net

COMMENTS	BRIAN: Between the single-digit wear numbers and in-spec physical properties, we have only nice things to say about the IO-360 powering this Cessna through the skies. If there are any problems taking place under the cowl, we certainly don't see evidence of them here. The engine looks great from our point of view, so keep up the good work!	

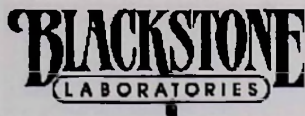
ELEMENTS IN PARTS PER MILLION	MI/HR on Oil	23	UNIT / LOCATION AVERAGES	33	26	30	28	23	UNIVERSAL AVERAGES
	MI/HR on Unit	2,292		2,269	2,236	2,210	2,131	2,102	
	Sample Date	4/20/2023		12/13/2022	8/15/2022	4/7/2022	10/25/2021	7/6/2021	
	Make Up Oil Added	3 qts		4.5 qts	3 qts	4.50 qts	2.5 qts	2 qts	
	ALUMINUM	2	6	2	3	1	2	3	6
	CHROMIUM	1	1	1	2	1	1	1	3
	IRON	7	10	9	10	7	9	9	22
	COPPER	2	6	3	3	3	3	3	6
	LEAD	1977	2734	2324	2347	2164	2051	2176	3431
	TIN	1	1	1	3	1	0	0	1
MOLYBDENUM	0	0	0	0	0	0	0	0	0
NICKEL	0	1	1	1	1	0	1	1	2
MANGANESE	0	0	0	0	0	0	0	0	0
SILVER	0	0	0	0	0	0	0	0	0
TITANIUM	0	0	0	0	0	0	0	0	0
POTASSIUM	0	0	0	0	0	0	0	0	0
BORON	1	1	1	2	0	0	1	1	1
SILICON	4	6	3	5	4	6	7	6	
SODIUM	4	1	2	3	1	2	2	1	
CALCIUM	149	42	149	162	124	140	137	29	
MAGNESIUM	1	1	1	1	1	0	2	1	
PHOSPHORUS	136	402	119	108	86	73	100	584	
ZINC	2	4	2	3	1	3	7	3	
BARIUM	0	0	0	0	0	0	0	0	

Values
Should Be*

PROPERTIES	SUS Viscosity @ 210°F	92.9	86-105	86.1	91.3	94.0	91.3	93.1
	cSt Viscosity @ 100°C	18.67	17.0-21.8	17.04	18.30	18.94	18.30	18.73
	Flashpoint in °F	465	>430	460	470	465	455	465
	Fuel %	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5
	Antifreeze %	-	-	-	-	-	-	-
	Water %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Insolubles %	0.4	<0.6	0.3	0.2	0.2	0.3	0.3
	TBN							
	TAN							
	ISO Code							

* THIS COLUMN APPLIES ONLY TO THE CURRENT SAMPLE

416 E. PETTIT AVE. FORT WAYNE, IN 46806 (260) 744-2380 www.blackstone-labs.com



OIL REPORT

LAB NUMBER: Q59079
REPORT DATE: 1/6/2023
CODE: 63/88

UNIT ID: N52713
CLIENT ID: 67139
PAYMENT: CC: Visa

UNIT	MAKE/MODEL: Lycoming IO-360-A1B6D	OIL TYPE & GRADE: Phillips XC (A/C) 20W/50
	FUEL TYPE: Gasoline (Leaded)	OIL USE INTERVAL: 33 Hours
	ADDITIONAL INFO: Cessna 177RG "Cardinal", Eng S/N L-27321-51A A/C has aluminum dipstick.	

CLIENT	BRIAN OSTWINKLE	PHONE: (319) 465-5488
	MONTICELLO AVIATION	FAX: (319) 465-5489
	POB 188	ALT PHONE:
	MONTICELLO, IA 52310	EMAIL: monticelloaviation@qwestoffice.net

COMMENTS
BRIAN: No new issues to report for this latest sample from N52713. Metals are low compared to universal averages and steady compared to previous samples from this engine, and that's the perfect combination as far as we're concerned. Metals have improved slightly from last time, even though this was a longer oil run, but that's probably due to the increased make-up oil. No moisture, dirt, fuel, or other contaminants were detected, and low insolubles show good oil filtration. Looks like another perfect report to us!

ELEMENTS IN PARTS PER MILLION	MILHR on Oil	33	UNIT / LOCATION AVERAGES	26	30	28	23	35	UNIVERSAL AVERAGES
	MILHR on Unit	2,269		2,236	2,210	2,131	2,102	2,079	
	Sample Date	12/13/2022		8/15/2022	4/7/2022	10/25/2021	7/6/2021	3/31/2021	
	Make Up Oil Added	4.5 qts		3 qts	4.50 qts	2.5 qts	2 qts	7.5 qts	
ALUMINUM	2	6	3	1	2	3	1	5	6
CHROMIUM	1	1	2	1	1	1	1	3	3
IRON	9	11	10	7	9	9	6	22	22
COPPER	3	6	3	3	3	3	2	5	5
LEAD	2324	2755	2347	2164	2051	2176	2368	3442	3442
TIN	1	1	3	1	0	0	0	1	1
MOLYBDENUM	0	0	0	0	0	0	0	0	0
NICKEL	1	1	1	0	1	1	0	2	2
MANGANESE	0	0	0	0	0	0	0	0	0
SILVER	0	0	0	0	0	0	0	0	0
TITANIUM	0	0	0	0	0	0	0	0	0
POTASSIUM	0	0	0	0	0	0	0	0	0
BORON	1	1	2	0	0	1	1	1	1
SILICON	3	6	5	4	6	7	3	6	6
SODIUM	2	1	3	1	2	2	3	1	1
CALCIUM	149	39	162	124	140	137	112	28	28
MAGNESIUM	1	1	1	1	0	2	1	1	1
PHOSPHORUS	119	409	108	86	73	100	92	589	589
ZINC	2	4	3	1	3	7	1	3	3
BAPIUM	0	0	0	0	0	0	0	0	0

Values
Should Be*

PROPERTIES	SUS Viscosity @ 210°F	86.1	86-105	91.3	94.0	91.3	93.1	95.9
	cSt Viscosity @ 100°C	17.04	17.0-21.8	18.30	18.94	18.30	18.73	19.38
	Flashpoint in °F	460	>430	470	465	455	465	445
	Fuel %	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5
	Antifreeze %	-	-	-	-	-	-	-
	Water %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Insolubles %	0.3	<0.6	0.2	0.2	0.3	0.3	0.4
	TBN							
	TAN							
	ISO Code							

* THIS COLUMN APPLIES ONLY TO THE CURRENT SAMPLE

416 E. PETTIT AVE. FORT WAYNE, IN 46806 (260) 744-2380 www.blackstone-labs.com



OIL REPORT

LAB NUMBER: Q11582
REPORT DATE: 8/26/2022
CODE: 63/68

UNIT ID: N52713
CLIENT ID: 67139
PAYMENT: CC: Visa

UNIT

MAKE/MODEL: Lycoming IO-360-A1B6D OIL TYPE & GRADE: Phillips XC (A/C) 20W/50
FUEL TYPE: Gasoline (Leaded) OIL USE INTERVAL: 26 Hours
ADDITIONAL INFO: Cessna 177RG "Cardinal", Eng S/N L-27321-51A A/C has aluminum dipstick.

CLIENT

BRIAN OSTWINKLE PHONE: (319) 465-5488
MONTICELLO AVIATION FAX: (319) 465-5489
POB 168 ALT PHONE:
MONTICELLO, IA 52310 EMAIL: monticelloaviation@qwestoffice.net

COMMENTS

BRIAN: This is another nice report from N52713. All the wear metals are still reading within comfortably healthy ranges for this engine type, and no contamination from fuel dilution, water, or excess dirt was found. This engine's stable diet of CamGuard is apparent in the calcium and phosphorus values, both of which are just additive elements. If we had suggestions for you, we'd be sure to pass them on, but this engine doesn't leave us with much to talk about.

ELEMENTS IN PARTS PER MILLION	MI/HR on Oil	26	UNIT / LOCATION AVERAGES	30	28	23	35	34	UNIVERSAL AVERAGES
	MI/HR on Unit	2,236		2,210	2,131	2,102	2,079	2,046	
	Sample Date	8/15/2022		4/7/2022	10/25/2021	7/6/2021	3/31/2021	11/5/2020	
	Make Up Oil Added	3 qts		4.50 qts	2.5 qts	2 qts	7.5 qts	7 qts	
	ALUMINUM	3	6	1	2	3	1	1	6
	CHROMIUM	2	1	1	1	1	1	1	3
	IRON	10	11	7	9	9	6	6	22
	COPPER	3	6	3	3	3	2	2	6
	LEAD	2347	2768	2164	2051	2176	2368	2034	3448
	TIN	3	1	1	0	0	0	1	1
	MOLYBDENUM	0	0	0	0	0	0	0	0
	NICKEL	1	1	0	1	1	0	0	2
	MANGANESE	0	0	0	0	0	0	0	0
	SILVER	0	0	0	0	0	0	0	0
	TITANIUM	0	0	0	0	0	0	0	0
	POTASSIUM	0	0	0	0	0	0	0	0
	BORON	2	0	0	0	1	1	0	1
	SILICON	5	6	4	6	7	3	4	6
	SODIUM	3	1	1	2	2	3	2	1
	CALCIUM	162	35	124	140	137	112	105	27
	MAGNESIUM	1	1	1	0	2	1	1	1
	PHOSPHORUS	108	418	86	73	100	92	108	593
	ZINC	3	4	1	3	7	1	1	3
	BARIUM	0	0	0	0	0	0	0	0

Values
Should Be*

SUS Viscosity @ 210°F	91.3	86-105	94.0	91.3	93.1	95.9	90.6
cSt Viscosity @ 100°C	18.30	17.0-21.8	18.94	18.30	18.73	19.38	18.12
Flashpoint in °F	470	>430	465	455	465	445	475
Fuel %	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5
Antifreeze %	-	-	-	-	-	-	-
Water %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Insolubles %	0.2	<0.6	0.2	0.3	0.3	0.4	0.4
TBN							
TAN							
ISO Code							

* THIS COLUMN APPLIES ONLY TO THE CURRENT SAMPLE

416 E. PETTIT AVE. FORT WAYNE, IN 46806 (260) 744-2380 www.blackstone-labs.com



OIL REPORT

LAB NUMBER: P63084
REPORT DATE: 4/19/2022
CODE: 63/68

UNIT ID: N52713
CLIENT ID: 67139
PAYMENT: CC: Visa

UNIT

MAKE/MODEL: Lycoming IO-360-A1B6D OIL TYPE & GRADE: Phillips XC (A/C) 20W/50
FUEL TYPE: Gasoline (Leaded) OIL USE INTERVAL: 30 Hours
ADDITIONAL INFO: Cessna 177RG "Cardinal", Eng S/N L-27321-51A A/C has aluminum dipstick.

CLIENT

BRIAN OSTWINKLE PHONE: (319) 465-5488
MONTICELLO AVIATION FAX: (319) 465-5489
POB 168 ALT PHONE:
MONTICELLO, IA 52310 EMAIL: monticelloaviation@qwestoffice.net

COMMENTS

BRIAN: The wear levels in the last couple samples didn't leave much room for improvement, but aluminum and iron still managed to come in a little lower this time around. The other wear metals are in good shape, too, so we aren't seeing even a hint of a developing mechanical issue at 2210.1 hours since major. There aren't any contamination or filtration issues to point out, either. Nicely done!

ELEMENTS IN PARTS PER MILLION	MI/HR on Oil	30	UNIT / LOCATION AVERAGES	28	23	35	34	26	UNIVERSAL AVERAGES
	MI/HR on Unit	2,210		2,131	2,102	2,079	2,046	2,012	
	Sample Date	4/7/2022		10/25/2021	7/6/2021	3/31/2021	11/5/2020	7/23/2020	
	Make Up Oil Added	4.50 qts		2.5 qts	2 qts	7.5 qts	7 qts	5 qts	
	ALUMINUM	1	6	2	3	1	1	2	6
	CHROMIUM	1	1	1	1	1	1	1	3
	IRON	7	11	9	9	6	6	8	22
	COPPER	3	6	3	3	2	2	2	6
	LEAD	2164	2780	2051	2176	2368	2034	2374	3454
	TIN	1	1	0	0	0	1	2	1
MOLYBDENUM	0	0	0	0	0	0	0	0	
NICKEL	0	1	1	1	0	0	1	2	
MANGANESE	0	0	0	0	0	0	0	0	
SILVER	0	0	0	0	0	0	0	0	
TITANIUM	0	0	0	0	0	0	0	0	
POTASSIUM	0	0	0	0	0	0	0	1	
BORON	0	0	0	1	1	0	0	1	
SILICON	4	6	6	7	3	4	8	6	
SODIUM	1	1	2	2	3	2	1	1	
CALCIUM	124	32	140	137	112	105	135	27	
MAGNESIUM	1	1	0	2	1	1	2	1	
PHOSPHORUS	26	427	73	100	92	108	109	595	
ZINC	1	4	3	7	1	1	3	3	
BARIUM	0	0	0	0	0	0	0	0	

Values
Should Be*

SUS Viscosity @ 210°F	94.0	86-105	91.3	93.1	95.9	90.6	92.5
cSt Viscosity @ 100°C	18.94	17.0-21.8	18.30	18.73	19.38	18.12	18.59
Flashpoint in °F	455	>430	455	465	445	475	485
Fuel %	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5
Antifreeze %	-	-	-	-	-	-	-
Water %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Insolubles %	0.2	<0.5	0.3	0.3	0.4	0.4	0.3
TBN							
TAN							
CFI Index							

* THIS COLUMN APPLIES ONLY TO THE CURRENT SAMPLE

415 E. PETTIT AVE. FORT WA YNE, IN 46806 (260) 744-2300 www.blackstone-labs.com



OIL REPORT

LAB NUMBER: P08373

UNIT ID: N52713

REPORT DATE: 11/15/2021

CLIENT ID: 67139

CODE: 63/68

PAYMENT: CC: Visa

UNIT	MAKE/MODEL: Lycoming IO-360-A1B6D	OIL TYPE & GRADE: Phillips XC (A/C) 20W/50
	FUEL TYPE: Gasoline (Leaded)	OIL USE INTERVAL: 28 Hours
	ADDITIONAL INFO: Cessna 177RG "Cardinal", Eng S/N L-27321-51A A/C has aluminum dipstick.	

CLIENT	BRIAN OSTWINKLE	PHONE: (319) 465-5488
	MONTICELLO AVIATION	FAX: (319) 465-5489
	POB 168	ALT PHONE:
	MONTICELLO, IA 52310	EMAIL: monticelloaviation@qwestoffice.net

COMMENTS	BRIAN: This engine continues to impress in testing. It's also impressive to see how little oil you're going through these days. We wondered if the drop in oil use was going to be just a one-time, fluke kind of thing, but apparently not! This engine consumed just 2.5 quarts this oil run, which is still a nice improvement over some of the late 2020/early 2021 samples. Very nice! No contamination turned up and the viscosity read within range.
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ELEMENTS IN PARTS PER MILLION	MI/HR on Oil	28	UNIT / LOCATION AVERAGES	23	35	34	26	19	UNIVERSAL AVERAGES
	MI/HR on Unit	2,131		2,102	2,079	2,046	2,012	1,984	
	Sample Date	10/25/2021		7/6/2021	3/31/2021	11/5/2020	7/23/2020	3/16/2020	
	Make Up Oil Added	2.5 qts		2 qts	7.5 qts	7 qts	5 qts	4 qts	
ALUMINUM	2	6		3	1	1	2	1	6
CHROMIUM	1	1		1	1	1	1	1	3
IRON	9	11		9	6	6	8	5	22
COPPER	3	6		3	2	2	2	2	6
LEAD	2051	2799		2176	2368	2034	2374	2026	3468
TIN	0	1		0	0	1	2	1	1
MOLYBDENUM	0	0		0	0	0	0	0	0
NICKEL	1	1		1	0	0	1	0	2
MANGANESE	0	0		0	0	0	0	0	0
SILVER	0	0		0	0	0	0	0	0
TITANIUM	0	0		0	0	0	0	0	0
POTASSIUM	0	0		0	0	0	1	1	1
BORON	0	0		1	1	0	0	2	1
SILICON	6	6		7	3	4	8	4	5
SODIUM	2	1		2	3	2	1	3	1
CALCIUM	140	29		137	112	105	135	102	26
MAGNESIUM	0	1		2	1	1	2	2	1
PHOSPHORUS	73	437		100	92	108	108	109	605
ZINC	3	4		7	1	1	3	3	3
BARIUM	0	0		0	0	0	0	0	0

Values
Should Be*

PROPERTIES	SUS Viscosity @ 210°F	91.3	86-105	93.1	95.9	90.6	92.5	88.2
	cSt Viscosity @ 100°C	18.30	17.0-21.8	18.73	19.38	18.12	18.59	17.54
	Flashpoint in °F	455	>430	465	445	475	495	470
	Fuel %	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5
	Antifreeze %	-	-	-	-	-	-	-
	Water %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Insolubles %	0.3	<0.6	0.3	0.4	0.4	0.3	0.3
	TBN							
	TAN							
	ISO Code							

* THIS COLUMN APPLIES ONLY TO THE CURRENT SAMPLE

416 E. PETTIT AVE. FORT WAYNE, IN 46806 (260) 744-2380 www.blackstone-labs.com



OIL REPORT

LAB NUMBER: N32379
 REPORT DATE: 4/19/2021
 CODE: 63/68

UNIT ID: N52713
 CLIENT ID: 67139
 PAYMENT: CC: MC

UNIT	MAKE/MODEL: Lycoming IO-360-A1B6D	OIL TYPE & GRADE: Phillips XC (A/C) 20W/50
	FUEL TYPE: Gasoline (Leaded)	OIL USE INTERVAL: 35 Hours
	ADDITIONAL INFO: Cessna 177RG "Cardinal", Eng S/N L-27321-51A A/C has aluminum dipstick.	

CLIENT	BRIAN OSTWINKLE	PHONE: (319) 465-5488
	MONTICELLO AVIATION	FAX: (319) 465-5489
	POB 168	ALT PHONE:
	MONTICELLO, IA 52310	EMAIL: monticelloaviation@qwestoffice.net

COMMENTS	BRIAN: Another nice report for this Cessna! Metals are almost rock-steady with the previous sample, and we don't find that sort of consistency every day. This Lycoming continues to wear better than most engines that we test. Lead blow-by is reasonable for the interval, and no fuel or water was detected in the oil itself. Keep up the excellent work!	
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ELEMENTS IN PARTS PER MILLION	MI/HR on Oil	35	UNIT / LOCATION AVERAGES	34	26	19	33	21	UNIVERSAL AVERAGES
	MI/HR on Unit	2,079		2,046	2,012	1,984	1,965	1,932	
	Sample Date	3/31/2021		11/5/2020	7/23/2020	3/16/2020	11/1/2019	8/7/2019	
	Make Up Oil Added	7.5 qts		7 qts	5 qts	4 qts	8 qts	6 qts	
	ALUMINUM	1	6	1	2	1	2	2	6
	CHROMIUM	1	1	1	1	1	1	2	3
	IRON	6	11	6	8	5	7	8	22
	COPPER	2	6	2	2	2	2	2	6
	LEAD	2368	2843	2034	2374	2026	2241	2002	3507
	TIN	0	1	1	2	1	0	1	1
	MOLYBDENUM	0	0	0	0	0	0	0	0
	NICKEL	0	1	0	1	0	0	0	2
	MANGANESE	0	0	0	0	0	0	0	0
	SILVER	0	0	0	0	0	0	0	0
	TITANIUM	0	0	0	0	0	0	0	0
	POTASSIUM	0	0	0	1	1	1	1	1
	BORON	1	0	0	0	2	0	1	1
	SILICON	3	6	4	8	4	3	3	5
	SODIUM	3	1	2	1	3	1	2	1
	CALCIUM	112	22	105	135	102	60	83	24
	MAGNESIUM	1	1	1	2	2	0	1	1
	PHOSPHORUS	92	460	108	108	109	33	53	616
	ZINC	1	4	1	3	3	2	2	3
	BARIUM	0	0	0	0	0	0	0	0

Values
Should Be*

PROPERTIES	SUS Viscosity @ 210°F	95.9	86-105	90.6	92.5	88.2	99.1	90.7
	cSt Viscosity @ 100°C	19.38	17.0-21.8	18.12	18.59	17.54	20.14	18.14
	Flashpoint in °F	445	>430	475	495	470	440	455
	Fuel %	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5
	Antifreeze %	-	-	-	-	-	-	-
	Water %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Insolubles %	0.4	<0.6	0.4	0.3	0.3	0.3	0.2
	TBN							
	TAN							
	ISO Code							

* THIS COLUMN APPLIES ONLY TO THE CURRENT SAMPLE

416 E. PETTIT AVE. FORT WAYNE, IN 46806 (260) 744-2380 www.blackstone-labs.com



OIL REPORT

LAB NUMBER: M86163 UNIT ID: N52713
 REPORT DATE: 11/20/2020 CLIENT ID: 67139
 CODE: 63/68 PAYMENT: CC: MC

UNIT	MAKE/MODEL: Lycoming IO-360-A1B6D	OIL TYPE & GRADE: Phillips XC (A/C) 20W/50
	FUEL TYPE: Gasoline (Leaded)	OIL USE INTERVAL: 34 Hours
	ADDITIONAL INFO: Cessna 177RG "Cardinal", Eng S/N L-27321-51A A/C has aluminum dipstick.	

CLIENT	BRIAN OSTWINKLE	PHONE: (319) 465-5488
	MONTICELLO AVIATION	FAX: (319) 465-5489
	POB 168	ALT PHONE:
	MONTICELLO, IA 52310	EMAIL: monticelloaviation@qwestoffice.net

COMMENTS	BRIAN: N52713 is no stranger to perfect reports, and this is another nice one at 2,045.5 hours SMOH. No moisture, dirt, fuel, or other harmful contaminants were detected, and the wear metals have improved to some of the lowest readings on the page, despite this being the longest oil run we've seen from this engine in the past few years. From what we can see, this engine is wearing better than ever, and we don't see any signs of problems developing. Insolubles at 0.4% are slightly higher than before, but still well below the level we'd consider to be a problem.
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ELEMENTS IN PARTS PER MILLION	MI/HR on Oil	34	26	19	33	21	28	UNIVERSAL AVERAGES
	MI/HR on Unit	2,046	2,012	1,984	1,965	1,932	1,823	
	Sample Date	11/5/2020	7/23/2020	3/16/2020	11/1/2019	8/7/2019	4/7/2018	
	Make Up Oil Added	7 qts	5 qts	4 qts	8 qts	6 qts		
ALUMINUM	1	6	2	1	2	2	2	6
CHROMIUM	1	1	1	1	1	2	2	3
IRON	6	11	8	5	7	8	10	22
COPPER	2	6	2	2	2	2	2	6
LEAD	2034	2859	2374	2026	2241	2002	2824	3514
TIN	1	1	2	1	0	1	1	1
MOLYBDENUM	0	0	0	0	0	0	0	0
NICKEL	0	1	1	0	0	0	1	2
MANGANESE	0	0	0	0	0	0	0	0
SILVER	0	0	0	0	0	0	0	0
TITANIUM	0	0	0	0	0	0	0	0
POTASSIUM	0	0	1	1	1	1	0	1
BORON	0	0	0	2	0	1	0	1
SILICON	4	6	8	4	3	3	6	5
SODIUM	2	1	1	3	1	2	0	1
CALCIUM	105	19	135	102	60	83	8	23
MAGNESIUM	1	1	2	2	0	1	1	1
PHOSPHORUS	108	472	108	109	33	53	10	618
ZINC	1	4	3	3	2	2	1	3
BARIUM	0	0	0	0	0	0	0	0

Values
Should Be*

PROPERTIES	SUS Viscosity @ 210°F	90.6	86-105	92.5	88.2	99.1	90.7	92.4
	cSt Viscosity @ 100°C	18.12	17.0-21.8	18.59	17.54	20.14	18.14	18.55
	Flashpoint in °F	475	>430	495	470	440	455	450
	Fuel %	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5
	Antifreeze %	-	-	-	-	-	-	-
	Water %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Insolubles %	0.4	<0.6	0.3	0.3	0.3	0.2	0.4
	TBN							
	TAN							
	ISO Code							

* THIS COLUMN APPLIES ONLY TO THE CURRENT SAMPLE

416 E. PETTIT AVE. FORT WAYNE, IN 46806 (260) 744-2380 www.blackstone-labs.com



OIL REPORT

LAB NUMBER: M48859 UNIT ID: N52713
REPORT DATE: 8/3/2020 CLIENT ID: 67139
CODE: 63/68 PAYMENT: CC: MC

UNIT
MAKE/MODEL: Lycoming IO-360-A1B6D OIL TYPE & GRADE: Phillips XC (A/C) 20W/50
FUEL TYPE: Gasoline (Leaded) OIL USE INTERVAL: 26 Hours
ADDITIONAL INFO: Cessna 177RG "Cardinal", Eng S/N L-27321-51A A/C has aluminum dipstick.

CLIENT
BRIAN OSTWINKLE PHONE: (319) 465-5488
MONTICELLO AVIATION FAX: (319) 465-5489
POB 168 ALT PHONE:
MONTICELLO, IA 52310 EMAIL: monticelloaviation@qwestoffice.net

COMMENTS
BRIAN: We're pleased with the way this engine is wearing. The established trend shows low wear levels compared to universal averages, and that means this engine tends to wear better than most other IO-360-A1B6D engines we've tested. If there are any issues in the works, the evidence isn't in these results. There isn't any fuel or water to point out, and low silicon and insolubles show the air and oil filters are both doing a great job. Just keep up the good work with N52713. It's in great shape as of 7/23/2020, the sample date!

ELEMENTS IN PARTS PER MILLION	MI/HR on Oil	26	UNIT / LOCATION	19	33	21	28	23	UNIVERSAL AVERAGES
	MI/HR on Unit	2,012	AVERAGES	1,984	1,965	1,932	1,823	1,682	
	Sample Date	7/23/2020		3/16/2020	11/1/2019	8/7/2019	4/7/2018	4/27/2017	
	Make Up Oil Added	5 qts		4 qts	8 qts	6 qts			
	ALUMINUM	2	7	1	2	2	2	2	6
	CHROMIUM	1	1	1	1	2	2	1	3
	IRON	8	11	5	7	8	10	7	22
	COPPER	2	6	2	2	2	2	2	6
	LEAD	2374	2887	2026	2241	2002	2824	2560	3528
	TIN	2	1	1	0	1	1	0	1
	MOLYBDENUM	0	0	0	0	0	0	0	0
	NICKEL	1	1	0	0	0	1	1	2
	MANGANESE	0	0	0	0	0	0	0	0
	SILVER	0	0	0	0	0	0	0	0
	TITANIUM	0	0	0	0	0	0	0	0
	POTASSIUM	1	0	1	1	1	0	0	1
	BORON	0	0	2	0	1	0	0	1
	SILICON	8	6	4	3	3	6	4	5
	SODIUM	1	1	3	1	2	0	1	1
	CALCIUM	135	16	102	60	83	8	7	22
	MAGNESIUM	2	1	2	0	1	1	0	1
	PHOSPHORUS	108	485	109	33	53	10	11	628
	ZINC	3	4	3	2	2	1	0	3
	BARIUM	0	0	0	0	0	0	0	0

Values
Should Be*

PROPERTIES	SUS Viscosity @ 210°F	92.5	86-105	88.2	99.1	90.7	92.4	92.1
	cSt Viscosity @ 100°C	18.59	17.0-21.8	17.54	20.14	18.14	18.55	18.48
	Flashpoint in °F	495	>430	470	440	455	450	450
	Fuel %	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5
	Antifreeze %	-	-	-	-	-	-	-
	Water %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Insolubles %	0.3	<0.6	0.3	0.3	0.2	0.4	0.4
	TBN							
	TAN							
	ISO Code							

* THIS COLUMN APPLIES ONLY TO THE CURRENT SAMPLE

416 E. PETTIT AVE. FORT WAYNE, IN 46806 (260) 744-2380 www.blackstone-labs.com



OIL REPORT

LAB NUMBER: M12952 UNIT ID: N52713
 REPORT DATE: 3/24/2020 CLIENT ID: 67139
 CODE: 63/68 PAYMENT: CC: MC

UNIT	MAKE/MODEL: Lycoming IO-360-A1B6D	OIL TYPE & GRADE: Phillips XC (A/C) 20W/50
	FUEL TYPE: Gasoline (Leaded)	OIL USE INTERVAL: 19 Hours
	ADDITIONAL INFO: Cessna 177RG "Cardinal", Eng S/N L-27321-51A A/C has aluminum dipstick.	

CLIENT	BRIAN OSTWINKLE	PHONE: (319) 465-5488
	MONTICELLO AVIATION	FAX: (319) 465-5489
	POB 168	ALT PHONE:
	MONTICELLO, IA 52310	EMAIL: monticelloaviation@qwestoffice.net

COMMENTS	BRIAN: Wear metals are almost negligible in this sample, with every single one reading at five ppm or less. That's hardly anything in analysis! Of course, this engine always wears very well, with metals below universal average levels more often than not, but this is a really great sample, even by N52713's regular standards. No wear issues stand out with so little metal in the used oil. We mentioned the source of calcium and phosphors last time (CamGuard) so don't be concerned by the increases, and there's no sign of harmful contamination either. Another great report.	
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ELEMENTS IN PARTS PER MILLION	MI/HR on Oil	19	UNIT / LOCATION AVERAGES	33	21	28	23	90	UNIVERSAL AVERAGES
	MI/HR on Unit	1,984		1,965	1,932	1,823	1,682	1,689	
	Sample Date	3/16/2020		11/1/2019	8/7/2019	4/7/2018	4/27/2017	11/27/2015	
	Make Up Oil Added	4 qts		8 qts	6 qts			6 qts	
	ALUMINUM	1	7	2	2	2	2	2	6
	CHROMIUM	1	1	1	2	2	1	2	3
	IRON	5	11	7	8	10	7	14	22
	COPPER	2	7	2	2	2	2	3	6
	LEAD	2026	2905	2241	2002	2824	2560	3841	3532
	TIN	1	1	0	1	1	0	3	1
	MOLYBDENUM	0	0	0	0	0	0	0	0
	NICKEL	0	1	0	0	1	1	0	2
	MANGANESE	0	0	0	0	0	0	0	0
	SILVER	0	0	0	0	0	0	0	0
	TITANIUM	0	0	0	0	0	0	0	0
	POTASSIUM	1	0	1	1	0	0	0	1
	BORON	2	0	0	1	0	0	0	1
	SILICON	4	6	3	3	6	4	4	5
	SODIUM	3	1	1	2	0	1	1	1
	CALCIUM	102	12	60	83	8	7	6	21
	MAGNESIUM	2	1	0	1	1	0	1	1
	PHOSPHORUS	109	498	33	53	10	11	43	632
	ZINC	3	4	2	2	1	0	2	3
	BARIUM	0	0	0	0	0	0	0	0

Values
Should Be*

PROPERTIES	SUS Viscosity @ 210°F	88.2	86-105	99.1	90.7	92.4	92.1	92.6
	cSt Viscosity @ 100°C	17.54	17.0-21.8	20.14	18.14	18.55	18.48	18.61
	Flashpoint in °F	470	>430	440	455	450	450	435
	Fuel %	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5
	Antifreeze %	-	-	-	-	-	-	-
	Water %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Insolubles %	0.3	<0.6	0.3	0.2	0.4	0.4	0.3
	TBN							
	TAN							
	ISO Code							

* THIS COLUMN APPLIES ONLY TO THE CURRENT SAMPLE

416 E. PETTIT AVE. FORT WAYNE, IN 46806 (260) 744-2380 www.blackstone-labs.com



OIL REPORT

LAB NUMBER: L74541
REPORT DATE: 11/8/2019
CODE: 63/32

UNIT ID: N52713
CLIENT ID: 67139
PAYMENT: CC: Visa

UNIT	MAKE/MODEL: Lycoming IO-360-A1B6D	OIL TYPE & GRADE: Phillips XC (A/C) 20W/50
	FUEL TYPE: Gasoline (Leaded)	OIL USE INTERVAL: 33 Hours
	ADDITIONAL INFO: Cessna 177RG "Cardinal", Eng S/N L-27321-51A A/C has aluminum dipstick.	

CLIENT	BRIAN OSTWINKLE	PHONE: (319) 465-5488
	MONTICELLO AVIATION	FAX: (319) 465-5489
	POB 168	ALT PHONE:
	MONTICELLO, IA 52310	EMAIL: monticelloaviation@qwestoffice.net

COMMENTS	BRIAN: It's been a great summer for this Cardinal. The wear metals still look great this time, and the engine was plenty active over the summer. Generally speaking, the more active an engine is, the better it wears. You (or the owner) have started using CamGuard lately. You can see that in the higher calcium and phosphorus readings as of late, and that's no problem. (The really high phosphorus reading in 2015 was just an additive in whatever oil was being used back then -- W100 Plus or 15W/50, for example). At any rate, we're just filling space. Long story short: nice!
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ELEMENTS IN PARTS PER MILLION	UNIT / LOCATION AVERAGES		21	28	23	90	43	UNIVERSAL AVERAGES
	MI/HR on Oil	33	1,932	1,823	1,682	1,689	1,642	
	MI/HR on Unit	1.965						
	Sample Date	11/1/2019	8/7/2019	4/7/2018	4/27/2017	11/27/2015	6/5/2015	
	Make Up Oil Added	8 qts	6 qts			6 qts	4-5 qts	
	ALUMINUM	2	7	2	2	2	3	6
	CHROMIUM	1	1	2	2	1	1	3
	IRON	7	12	8	10	7	14	22
	COPPER	2	7	2	2	2	3	6
	LEAD	2241	2938	2002	2824	2560	3841	3536
	TIN	0	1	1	1	0	3	1
	MOLYBDENUM	0	0	0	0	0	0	0
	NICKEL	0	1	0	1	1	0	2
	MANGANESE	0	0	0	0	0	0	0
	SILVER	0	0	0	0	0	0	0
	TITANIUM	0	0	0	0	0	0	0
	POTASSIUM	1	0	1	0	0	0	1
	BORON	0	0	1	0	0	0	3
	SILICON	3	6	3	6	4	4	5
	SODIUM	1	1	2	0	1	1	1
	CALCIUM	60	8	83	8	7	6	20
	MAGNESIUM	0	1	1	1	0	1	1
	PHOSPHORUS	33	512	53	10	11	43	633
	ZINC	2	4	2	1	0	2	3
	BARIUM	0	0	0	0	0	0	0

Values
Should Be*

PROPERTIES	SUS Viscosity @ 210°F	99.1	86-105	90.7	92.4	92.1	92.6	99.2
	cSt Viscosity @ 100°C	20.14	17.0-21.8	18.14	18.55	18.48	18.61	20.16
	Flashpoint in °F	440	>430	455	450	450	435	430
	Fuel %	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	0.5
	Antifreeze %	-	-	-	-	-	-	-
	Water %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Insolubles %	0.3	<0.6	0.2	0.4	0.4	0.3	0.2
	TBN							
	TAN							
	ISO Code							

* THIS COLUMN APPLIES ONLY TO THE CURRENT SAMPLE

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OIL REPORT

LAB NUMBER: L47203
REPORT DATE: 8/15/2019
CODE: 63/32

UNIT ID: N52713
CLIENT ID: 67139
PAYMENT: CC: Visa

UNIT	MAKE/MODEL: Lycoming IO-360-A1B6D	OIL TYPE & GRADE: Phillips XC (A/C) 20W/50
	FUEL TYPE: Gasoline (Leaded)	OIL USE INTERVAL: 21 Hours
	ADDITIONAL INFO: Cessna 177RG "Cardinal", Eng S/N L-27321-51A A/C has aluminum dipstick.	

CLIENT	BRIAN OSTWINKLE	PHONE: (319) 465-5488
	MONTICELLO AVIATION	FAX: (319) 465-5489
	POB 168	ALT PHONE:
	MONTICELLO, IA 52310	EMAIL: monticelloaviation@qwestoffice.net

COMMENTS	BRIAN: Excellent report for this Cardinal as of the 8/7/19 sample date. The only anomaly in this report is the presence of calcium. That element comes from CamGuard, so it's completely harmless, but it's unusual in that this engine hasn't used it before (and "no" was marked on the paperwork for additive use). But regardless the CamGuard didn't hurt anything and this engine is still wearing as well as we've come to expect. No problems found!	

	MI/HR on Oil	21	UNIT / LOCATION AVERAGES	28	23	90	43	34	UNIVERSAL AVERAGES
	MI/HR on Unit	1,932		1,823	1,682	1,689	1,642	1,598	
	Sample Date	8/7/2019		4/7/2018	4/27/2017	11/27/2015	6/5/2015	3/24/2015	
	Make Up Oil Added	6 qts				6 qts	4-5 qts		
ELEMENTS IN PARTS PER MILLION	ALUMINUM	2	7	2	2	2	3	1	6
	CHROMIUM	2	1	2	1	2	1	1	3
	IRON	8	12	10	7	14	8	6	22
	COPPER	2	7	2	2	3	7	7	6
	LEAD	2002	2965	2824	2560	3841	4266	3290	3539
	TIN	1	1	1	0	3	2	1	1
	MOLYBDENUM	0	0	0	0	0	0	0	0
	NICKEL	0	1	1	1	0	0	1	2
	MANGANESE	0	0	0	0	0	0	0	0
	SILVER	0	0	0	0	0	0	0	0
	TITANIUM	0	0	0	0	0	0	0	0
	POTASSIUM	1	0	0	0	0	1	0	1
	BORON	1	0	0	0	0	3	1	1
	SILICON	3	7	6	4	4	3	5	5
	SODIUM	2	1	0	1	1	1	0	1
	CALCIUM	83	6	8	7	6	5	1	19
	MAGNESIUM	1	1	1	0	1	0	2	1
	PHOSPHORUS	53	531	10	11	43	462	1345	635
	ZINC	2	4	1	0	2	3	5	3
	BARIUM	0	0	0	0	0	0	0	0

Values
Should Be*

PROPERTIES	SUS Viscosity @ 210°F	90.7	86-105	92.4	92.1	92.6	99.2	90.2
	cSt Viscosity @ 100°C	18.14	17.0-21.8	18.55	18.48	18.61	20.16	18.02
	Flashpoint in °F	455	>430	450	450	435	430	470
	Fuel %	<0.5	<1.0	<0.5	<0.5	<0.5	0.5	<0.5
	Antifreeze %	-	-	-	-	-	-	-
	Water %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Insolubles %	0.2	<0.6	0.4	0.4	0.3	0.2	0.3
	TBN							
	TAN							
	ISO Code							

* THIS COLUMN APPLIES ONLY TO THE CURRENT SAMPLE

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OIL REPORT

LAB NUMBER: K13288

UNIT ID: N52713

REPORT DATE: 4/19/2018

CLIENT ID: 63043

CODE: 63/32

PAYMENT: CC: Visa

UNIT	MAKE/MODEL: Lycoming IO-360-A1B6D	OIL TYPE & GRADE: Phillips XC (A/C) 20W/50
	FUEL TYPE: Gasoline (Leaded)	OIL USE INTERVAL: 28 Hours
	ADDITIONAL INFO: Cessna 177RG "Cardinal", Eng S/N L-27321-51A A/C has aluminum dipstick.	

CLIENT	TOM GRAY	PHONE: (732) 278-8201
	ON SITE AERO SERVICES	FAX:
	100 AIRPORT RD	ALT PHONE:
	EAGLES NEST AIRPORT	EMAIL: onsiteaero@yahoo.com
	WEST CREEK, NJ 08092	

COMMENTS	TOM: Here's another clean report for N52713 - not that we expected anything less. This Lycoming has a history of good results, and this report is no disappointment. Wear looks good, the sample's physical properties are in spec for this grade X/C, and no harmful contamination was detected. Air and oil filtration are top notch, too. Nothing more needs said - great engine!	

ELEMENTS IN PARTS PER MILLION	MI/HR on Oil	28	UNIT / LOCATION AVERAGES	23	90	43	34	41	UNIVERSAL AVERAGES
	MI/HR on Unit	1,823		1,682	1,689	1,642	1,598	1,566	
	Sample Date	4/7/2018		4/27/2017	11/27/2015	6/5/2015	3/24/2015	9/3/2014	
	Make Up Oil Added				6 qts	4-5 qts			
	ALUMINUM	2	7	2	2	3	1	2	6
	CHROMIUM	2	1	1	2	1	1	1	3
	IRON	10	12	7	14	8	6	9	22
	COPPER	2	7	2	3	7	7	12	6
	LEAD	2824	3003	2560	3841	4266	3290	3840	3542
	TIN	1	1	0	3	2	1	1	1
	MOLYBDENUM	0	0	0	0	0	0	0	0
	NICKEL	1	1	1	0	0	1	2	2
	MANGANESE	0	0	0	0	0	0	0	0
	SILVER	0	0	0	0	0	0	0	0
	TITANIUM	0	0	0	0	0	0	0	0
	POTASSIUM	0	0	0	0	1	0	0	1
	BORON	0	0	0	0	3	1	1	1
	SILICON	6	7	4	4	3	5	5	5
	SODIUM	0	1	1	1	1	0	2	1
	CALCIUM	8	3	7	6	5	1	1	17
	MAGNESIUM	1	1	0	1	0	2	2	1
	PHOSPHORUS	10	550	11	43	462	1345	1298	639
	ZINC	1	4	0	2	3	5	9	3
	BARIUM	0	0	0	0	0	0	0	0

Values
Should Be*

PROPERTIES	SUS Viscosity @ 210°F	92.4	86-105	92.1	92.6	99.2	90.2	88.9
	cSt Viscosity @ 100°C	18.55	17.0-21.8	18.48	18.61	20.16	18.02	17.71
	Flashpoint in °F	450	>430	450	435	430	470	485
	Fuel %	<0.5	<1.0	<0.5	<0.5	0.5	<0.5	<0.5
	Antifreeze %	-	-	-	-	-	-	-
	Water %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Insolubles %	0.4	<0.6	0.4	0.3	0.2	0.3	0.2
	TBN							
	TAN							
	ISO Code							

* THIS COLUMN APPLIES ONLY TO THE CURRENT SAMPLE

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