



Report of the Month

This was a weird sample from a TIO-540 engine.
Can you guess what happened?

To learn more about where the elements are coming from, [click here](#).

UNIT	MAKE/MODEL: Lycoming TIO-540-AJ1A	OIL TYPE & GRADE: Aircraft Engine Oil
	FUEL TYPE: Gasoline (Leaded)	OIL USE INTERVAL: Hours
	ADDITIONAL INFO: Cessna T206H	

COMMENTS Overall, these numbers relate quite well to what we've been seeing from this engine over the last year or so. The biggest change that stands out is at elements like moly, calcium, magnesium, and zinc, which together can show that regular automotive oil was added before at the last oil change. Internal wear still looks okay, with aluminum (from pistons) even coming down a little. Still, we'd suggest sticking to only using ashless dispersant oils that are approved for aviation use. No fuel or water contamination was found. Check back for an update.

ELEMENTS IN PARTS PER MILLION	MI/HR on Oil	UNIT / LOCATION AVERAGES	37	8	32	35	14	UNIVERSAL AVERAGES	
	MI/HR on Unit		1,542	1,514	1,506	1,439	1,366		
	Sample Date		7/5/2021	2/28/2021	11/1/2020	6/26/2020	4/1/2020		9/19/2019
	Make Up Oil Added				2 qts	1 qt			
ALUMINUM	15	20	19	15	21	29	19	7	
CHROMIUM	9	17	11	11	20	29	21	10	
IRON	69	84	69	58	110	133	65	59	
COPPER	11	11	13	9	16	14	4	10	
LEAD	3642	4525	4645	3311	6034	5838	3678	5080	
TIN	2	1	1	1	0	2	1	1	
MOLYBDENUM	39	7	0	0	0	0	0	0	
NICKEL	6	11	8	8	14	22	5	7	
MANGANESE	1	1	1	1	1	1	1	1	
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	85	14	1	0	0	0	0	1	
SILICON	6	7	5	5	7	7	12	9	
SODIUM	2	2	2	2	2	2	0	1	
CALCIUM	542	160	99	108	112	89	7	23	
MAGNESIUM	279	49	4	2	3	3	1	3	
PHOSPHORUS	446	118	64	90	58	50	0	455	
ZINC	458	83	11	6	8	9	3	6	
BARIUM	0	0	0	0	0	0	0	0	

Values
Should Be*

PROPERTIES	87.0	94.8	94.3	106.9	106.5	94.6
SUS Viscosity @ 210°F	87.0	94.8	94.3	106.9	106.5	94.6
cSt Viscosity @ 100°C	17.25	19.13	19.01	21.96	21.87	19.08
Flashpoint in °F	515	>440	510	500	505	495
Fuel %	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5
Antifreeze %	-	-	-	-	-	-
Water %	0.0	0.0	0.0	0.0	0.0	0.0
Insolubles %	0.4	<0.6	0.3	0.3	0.4	0.4
TBN						
TAN						
ISO Code						

* THIS COLUMN APPLIES ONLY TO THE CURRENT SAMPLE

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If you read the comments, this was an easy one. We noted higher levels of moly, boron, calcium, magnesium, phosphorus, and zinc in the oil - typical additives in non-AD oil, like the oil you use in your car. The owner didn't add 5W/30 to his aircraft engine, but he did add it to the sample, thinking it needed to be diluted since it came from the filter. No harm done since he only added it to the sample, not the engine itself.