



## Report of the Month

This Wright R-1820 radial has a problem. It's not obvious at all. Can you figure it out?

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

UNIT	MAKE/MODEL:	Wright R-1820-86B	OIL TYPE & GRADE:	Aeroshell W120 (AD)
	FUEL TYPE:	Gasoline (Leaded)	OIL USE INTERVAL:	32 Hours
	ADDITIONAL INFO:	North American T28B; BL-519096, oil screen and spin-on AirWolf filter		

COMMENTS	CHIP: This report looks a lot like the last one, though that's not necessarily a positive finding considering this oil run was about half as long as the previous sample. Metals holding steady over a shorter run actually means wear is higher on a per-hour basis. That being said, these results beat outright increases, and metals still compare nicely with averages for the engine type. We'll continue tracking silver (master rod bearing) and aluminum/iron (pistons/steel parts) in the next sample, but at this point no major issues stand out.
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ELEMENTS IN PARTS PER MILLION	MI/HR on Oil	32	UNIT / LOCATION AVERAGES	63	50	50	53	55	UNIVERSAL AVERAGES
	MI/HR on Unit	803		771	708	658	608	555	
	Sample Date	1/4/2021		10/22/2020	11/19/2019	7/9/2019	11/10/2018	7/2/2018	
	Make Up Oil Added	84 qts		128 qts	109 qts	120 qts	140 qts	145 qts	
	ALUMINUM	5	5	6	3	3	2	2	5
	CHROMIUM	1	2	2	1	1	1	1	2
	IRON	10	17	10	8	7	6	5	15
	COPPER	5	7	7	5	6	3	4	7
	LEAD	1213	1556	1715	1227	1397	1151	1039	1245
	TIN	0	1	1	1	0	0	1	1
	MOLYBDENUM	0	0	0	0	0	0	0	0
	NICKEL	2	2	2	2	1	1	1	2
	MANGANESE	0	0	0	0	1	0	0	0
	SILVER	1	0	1	0	0	0	0	0
	TITANIUM	0	0	0	0	0	0	0	0
	POTASSIUM	0	1	0	0	1	0	0	1
	BORON	0	1	0	0	1	0	0	0
	SILICON	7	8	10	10	11	7	11	8
	SODIUM	2	1	3	1	2	1	2	1
CALCIUM	4	3	3	3	5	3	4	4	
MAGNESIUM	4	5	4	5	5	2	3	4	
PHOSPHORUS	4	5	3	4	4	6	8	4	
ZINC	2	2	2	2	3	2	2	2	
BARIUM	0	0	0	0	0	0	0	0	

Values  
Should Be\*

PROPERTIES	SUS Viscosity @ 210°F	110.6	105-125	119.5	112.7	116.3	109.8	113.5
	cSt Viscosity @ 100°C	22.83	21.5-26.3	24.86	23.29	24.12	22.64	23.48
	Flashpoint in °F	510	>450	525	500	500	495	500
	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	0.2	0.3	0.5
	TBN							
	TAN							
	ISO Code							

The answer to this one is hidden in the comments. We briefly mentioned the 1 ppm silver and said, "no major issues stand out." But silver is a master rod bearing metal in radial engines, and because radials use so much oil, all the metal levels are diluted. When the owners saw the 1 ppm silver, they checked the filter and found small, visible silver flakes. Upon analysis, the flakes were found to be from the rod bearings. As a result, the owners ended up replacing the engine. They write: "That sample may have prevented and engine failure and/or subsequent loss of aircraft or life. We are firm believers in your process and company."