

Report of the Month

Whoa, daddy. That's a lot of metal. Can you tell what's going on with this O-300-D?

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

ELEMENTS IN PARTS PER MILLION	MI/HR on Oil	25	UNIT/ LOCATION AVERAGES	28	27	32	34	UNIVERSAL AVERAGES
	MI/HR on Unit	149		98	38	1724	1689	
	Sample Date	6/11/2016		6/20/2015	5/10/2014	5/29/2013	10/16/2012	
	ALUMINUM	192	7	29	26	10	6	8
	CHROME	11	11	11	3	15	10	5
	IRON	124	34	87	77	43	39	39
	COPPER	21	10	21	48	14	11	10
	LEAD	3379	2620	2902	1697	4069	3099	2185
	TIN	4	1	3	4	2	1	1
	MOLYBDENUM	9	2	5	4	3	2	1
	NICKEL	6	1	3	2	2	1	1
	POTASSIUM	2	1	0	9	0	0	1
	BORON	0	0	1	1	1	1	1
	SILICON	46	6	28	42	9	2	7
	SODIUM	2	1	2	2	1	1	1
	CALCIUM	6	4	7	2	7	2	13
	MAGNESIUM	7	2	4	4	2	2	8
	PHOSPHORUS	2	3	4	0	0	0	361
	ZINC	2	2	3	3	3	1	5
	BARIUM	0	0	0	0	0	0	0

Values
Should Be*

PROPERTIES	SUS Viscosity @210°F	91.6	86-105	96.3	77.1	90.7	94.1
	cSt Viscosity @ 100°C	18.36	17.0-21.8	19.48	14.80	18.14	18.97
	Flashpoint in °F	465	>430	465	525	485	520
	Fuel %	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5
	Antifreeze %	-	-	-	-	-	-
	Water %	0.0	0.1	0.0	0.0	0.0	0.0
	Insolubles %	0.5	<0.6	0.3	0.4	0.4	0.4
	TBN						

We had given the owner of this Cessna a phone call when we found so much metal in his oil, so he and his mechanic did some investigative work. The borescope came up clean in all cylinders with no problems found, but one cylinder had low compression... "almost zero," he said. When they pulled the cylinders off, chunks of metal literally fell out of the cylinder and into his hand. The second ring had completely broken, and that actually destroyed the ring land between the second and third ring. The pieces of the broken ring itself were still in the cylinder, but the aluminum from the ring land was small enough to escape. They cut the filter open (which they hadn't done prior to sending us the sample) and found many large pieces of aluminum throughout the filter, which corresponds with the large spike in aluminum in analysis. The elevated chrome is from the rings. The owner said that without our analysis, he never would have known anything was wrong, since on a six-cylinder engine he wasn't noticing a loss of power and there were no obvious problems apparent on his end (until the oil filter was cut open, anyway). The mechanic said the problem was caught early enough that they wouldn't have to replace the whole cylinder - just rehone and put in a new piston and rings - so we definitely saved him a few bucks this time around!