

Report of the Month

Metals shot up in the November '18 sample from the IO-360 in this Piper. What happened?

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

ELEMENTS IN PARTS PER MILLION	MI/HR on Oil	10	UNIT / LOCATION AVERAGES	24	39	38			UNIVERSAL AVERAGES
	MI/HR on Unit	1,199			1,161	1,160			
	Sample Date	5/6/2019		11/12/2018	5/10/2018	3/20/2018			
	Make Up Oil Added	4 qts		7.5 qts					
	ALUMINUM	16	30	67	11	18			7
	CHROMIUM	4	8	19	3	4			4
	IRON	24	51	90	39	45			24
	COPPER	7	13	15	12	12			8
	LEAD	1647	3954	6055	2896	3247			3878
	TIN	1	2	4	1	2			1
	MOLYBDENUM	0	0	1	0	0			0
	NICKEL	2	5	8	6	6			2
	MANGANESE	1	0	1	0	1			0
	SILVER	0	0	0	0	0			0
	TITANIUM	0	0	0	0	0			0
	POTASSIUM	1	1	1	0	0			1
	BORON	1	0	0	1	0			1
	SILICON	16	9	12	5	473			5
	SODIUM	5	2	0	2	2			2
	CALCIUM	3	5	8	7	3			19
	MAGNESIUM	3	12	14	21	22			4
	PHOSPHORUS	363	1477	401	1281	1181			646
	ZINC	2	8	7	13	11			6
	BARIUM	0	0	0	0	0			0

Values
Should Be*

PROPERTIES	SUS Viscosity @ 210°F	92.1	85-104	103.0	91.1	96.2		
	cSt Viscosity @ 100°C	18.48	16.8-21.5	21.06	18.24	19.46		
	Flashpoint in °F	485	>460	470	470	455		
	Fuel %	<0.5	<1.0	<0.5	<0.5	<0.5		
	Antifreeze %	-		-	-	-		
	Water %	0.0	<0.1	0.0	0.0	0.0		
	Insolubles %	0.3	<0.6	0.7	0.3	0.5		
	TBN							
	TAN							
	ISO Code							

The engine was running relatively well when the owner received the November sample showing a lot of metal. They checked compression and all was good until the first cylinder got to top dead center, when compression disappeared quickly. A borescope revealed flaking at the upper end of the cylinder, and the same problem was found in all the cylinders. The top compression rings on all the jugs were broken. They did a top overhaul and replaced the cylinders with nitrided steel bores. The engine has since recovered nicely.