

Report of the Month

This 2000 Jeep Wrangler has some serious issues. Can you tell what's going on?

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

ELEMENTS IN PARTS PER MILLION	MI/HR on Oil	7,247	UNIT/ LOCATION AVERAGES					UNIVERSAL AVERAGES
	MI/HR on Unit	300,834						
	Sample Date	9/4/15						
	ALUMINUM	436						4
	CHROME	18						1
	IRON	3135						26
	COPPER	33						4
	LEAD	737						3
	TIN	11						1
	MOLYBDENUM	91						71
	NICKEL	8						1
	POTASSIUM	16750						3
	BORON	12						46
	SILICON	250						12
	SODIUM	2172						46
	CALCIUM	2364						2037
	MAGNESIUM	1018						148
PHOSPHORUS	1338						732	
ZINC	1415						872	
BARIUM	18						0	

Values
Should Be*

PROPERTIES	SUS Viscosity @210°F	100.9	65-78				
	cSt Viscosity @ 100°C	20.58	11.6-15.3				
	Flashpoint in °F	390	>375				
	Fuel %	<0.5	<2.0				
	Antifreeze %	4.34	0.0				
	Water %	0.0	0.0				
	Insolubles %	20.0	<0.6				
	TBN	24.0	>1.0				

The very high levels of potassium and sodium are a dead giveaway here; this Jeep has a major anti-freeze problem. That's a common weakness of these 4.0L engines -- antifreeze tends to strike around 100,000 miles, but once the problem is fixed it can be quite a while before the issue reappears. That's what you're seeing here. The head gasket is allowing coolant into the oil supply, which does several bad things. Coolant destroys the oil's ability to lubricate, causing poor wear throughout the engine but especially at the bearings (copper, lead, tin) and shafts (iron). It also thickens the viscosity and causes sludge (insolubles) to form so the oil doesn't circulate as freely. Note the very high TBN -- excessive antifreeze contamination throws off a TBN reading. This engine needs help, pronto!