



Report of the Month

This Volvo marine engine has a problem.
Can you guess what happened?

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

UNIT	MAKE/MODEL: Volvo Marine D6-435	OIL TYPE & GRADE: 15W/40
	FUEL TYPE: Diesel	OIL USE INTERVAL: 293 Hours
	ADDITIONAL INFO: Delta 54	

COMMENTS	This is the port engine, and it's wearing heavily due to seawater contamination (evident in sodium and potassium). Silicon can be dirt or sealer material. Every metal is high, but the aluminum level is particularly concerning. In a healthy D6-435, aluminum is normally in the single digits and about 1/4 of the iron level. In this case, aluminum is easily the dominant metal and off the charts at 518 ppm. Chrome is a ring metal with iron from cylinders and shafts. Copper, lead, and tin are from bearings and bushings. Inspect ASAP.
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ELEMENTS IN PARTS PER MILLION	MI/HR on Oil	293	UNIT / LOCATION AVERAGES					UNIVERSAL AVERAGES
	MI/HR on Unit	1,800						
	Sample Date	7/7/2021						
	Make Up Oil Added							
ALUMINUM	518	20					3	
CHROMIUM	44	3					1	
IRON	361	59					11	
COPPER	24	15					5	
LEAD	32	5					1	
TIN	9	2					1	
MOLYBDENUM	73	72					30	
NICKEL	10	4					1	
MANGANESE	4	1					0	
SILVER	0	0					0	
TITANIUM	0	0					0	
POTASSIUM	52	1					3	
BORON	4	5					73	
SILICON	15	7					7	
SODIUM	1142	5					4	
CALCIUM	1306	1223					1749	
MAGNESIUM	1454	1199					493	
PHOSPHORUS	1169	1137					1091	
ZINC	1434	1400					1238	
BARIIUM	0	0					0	

Values
Should Be*

PROPERTIES	SUS Viscosity @ 210°F	79.5	69-80				
	cSt Viscosity @ 100°C	15.39	12.7-15.8				
	Flashpoint in °F	450	>415				
	Fuel %	<0.5	<2.0				
	Antifreeze %	2.28	0.0				
	Water %	0.0	0.0				
	Insolubles %	0.4	<0.6				
	TBN						
	TAN						
	ISO Code						

* THIS COLUMN APPLIES ONLY TO THE CURRENT SAMPLE

The owner writes: Just wanted to let you guys know you nailed it! The center engine blew a sea water hose in the Bahamas. The engine was discovered to have excessive blow-by and low compression on two cylinders. This analysis will aid in the insurance claim.