



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.
----------	---

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.