

American Motorcycle Institute (AMI) Test Results

Auto-Rx® safe to use with wet clutch

Test of Auto-Rx® in a Harley Davidson motorcycle
 Test Location: American Motorcycle Institute, Daytona Beach, Florida
 Oil Analysis, Comments, and Conclusion Provided by Dyson Analysis

Vehicle	2002 Harley Davidson RoadKing
Engine	Stock 88 CID Twin Cam
Start Mileage	10,770
End Mileage	12,500
Oil/Filters	Harley 20-50w; stock oil filters
Comments	Seemingly well-maintained twin cam engine with normal oil analysis signature before Auto-Rx®.

Test Stats Provided by AMI

110 psi both cylinders (mileage: 10,770)
 160 psi both cylinders (mileage: 12,500)
 Note: 2 gauges were used to confirm "after" results
 Heads pulled at 12,500 miles
 Test Duration: One month, 1730 miles
 @2000 miles on fresh oil, NO Auto-Rx®
 @1030 miles after 12 ounces Auto-Rx® added (Clean Phase)
 @700 miles AFTER fresh oil change with only residual cleaning effect of Auto-Rx® (Rinse Phase)

Elemental Analysis Tests Provided by Dyson Analysis

Oil Samples 1,2,3 Levels in ppm

Element	1	2	3	Comment
Aluminum	6	3	3	Normal trend and no increase in wear during or after cleaning
Calcium	1263	1129	2052	Normal oil add levels
Chromium	4	1	1	Significant decrease in ring and chrome coating wear during and after Auto-Rx® cleaning
Copper	23	10	4	MAJOR decrease in bushing and bearing wear AFTER Auto-Rx® cleaning
Iron	25	7	6	MAJOR decrease in cylinder and cam wear
Lead	9	0	8	During cleaning, lead bearing wear dropped to NIL; lead wear is a bit elevated by a dirt leak probably at the air filter or intake area. Auto-Rx® while installed stopped the bearing wear.
Magnesium	1092	563	741	Normal oil additive
Molybdenum	3	1	14	Ring coating, wear dropped with Auto-Rx®, spike of 14 ppm is oil or assembly lube add from post teardown.
Phosphorus	1240	804	760	Normal oil additives
Potassium	4	8	0	Normal oil additive and fuel add residuals, post Auto-Rx® residuals are cleaned.
Silicon	13	11	14	Ingested dirt from air filter or intake, lead wear is being elevated by this but the Auto-Rx® treatment helped slow the wear rates. Air filter and any dirt leaks on engine need to be corrected.
Sodium	5	6	2	Normal oil adds an environmental contamination
Tin	0	0	3	Bearing overlay and assembly lube residuals, note Auto-Rx® contributed no wear during cleaning phase. Spike in tin is also related to dirt ingress in Rinse Phase.
Zinc	1032	940	1813	Normal oil additive
Soot/Solids	13	0	12	Note MAJOR drop in solids production during cleaning phase, level returns to normal during Rinse Phase.
Oxidation	29%	38.5%	45.5%	Elevated trend indicates Auto-Rx® cleaning action is ongoing and active, oil is NOT oxidizing, but the cleaning of deposits is.

Nitration	25%	31%	16%	A good measure of combustion efficiency and high levels of nitration contribute to and enable varnish formation. Post Auto-Rx® drop in nitration means the cylinder is making much improved power, confirmed by correlating compression checks of up to 50 PSI increase.
Sulfur	26	0	35	Fuel and oil sulfur residuals, note improved ring seal with Auto-Rx® in Clean Phase.
Water	0	0	0	None through all three tests
Coolant	0	0	0	None through all three tests
Fuel Dilution	0	0	0	None through all three tests
Viscosity @ 100C in cSt	16.2	8.7	16.6	Test 1 shows a normal shear trend for the oil and indicating SAE 40w, test 2 shows a oil that is SAE 20w grade and probably sheared from SAE 40w, test 3 is normal, solid SAE 50w as designed, in other words a clean engine doesn't shear a average oil as easy.
Total Base Number (TBN)	9.5	8.0	10.0	Normal reserve alkalinity throughout test for the host motor oils. Auto-Rx does not harm the motor oil while cleaning.

Conclusions:

Relatively new HD engine on HD oil. Maintained by professionals of AMI. Saw impressive gains in performance and efficiency while dropping key wear areas in spite of an air or dirt ingress leak that persists throughout test. Our conclusion is that Auto-Rx® should be used in all Harley Davidson engines at least every 5,000 miles or annually. The Auto-Rx® treatment compensates for the lack of oil quality and real world dirt and cleanliness issues that all bikes will experience.

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