

Caterpillar 1P Test Method

SPECIFICATIONS

This test is part of API category CH-4.

OBJECTIVE

The objective of this test is to evaluate the performance of crankcase lubricants with respect to piston deposits, ring sticking, piston, ring and liner scuffing, as well as oil consumption, with a steel top, aluminum skirt, two piece piston.

FIELD SERVICE SIMULATED

High-speed turbocharged heavy-duty diesel engine service prior to 2002 is simulated.

TEST FIXTURE

The test fixture is a Caterpillar 1Y3700 single-cylinder direct-injection diesel test engine with a four-valve arrangement having a 5.4 in. bore and a 6.5 in. stroke resulting in a displacement of 148.8 cubic inches. Compression ratio is 16.25:1. Keystone top ring and second ring are used. The top ring is closer to the piston top than the 1K/1N. The engine features overhead cam and electronic injection control.

TEST PARAMETERS

Test parameters: 1800 rpm, 55kW, 185 g/min fuel rate, 95 °C coolant, 130 °C oil, 60 °C intake air, 272 Kpa intake air, 17.8 g/kg water vapor, 360-hour test length.



TEST PARTS

Test parts include: liner (1Y3805), steel piston crown (1Y3658), aluminum skirt (1Y3400) and ring set (1Y3802 top, 1Y3803 second, 1Y3804 oil) — all meeting Caterpillar's "3L" quality specifications.

TEST FUEL

Halterman reference fuel with a sulfur specification of 0.03 - 0.05 mass % and an API gravity specification of 32 - 36° is used.

TEST PARTS EVALUATED

Piston, rings and liner are evaluated. The piston is rated by the CRC (Coordinating Research Council) demerit procedure.

LUBRICANT ANALYSIS

Viscosity, TBN, TAN, wear metals, and a check for fuel dilution are performed.

PASS/FAIL CRITERIA

No piston, ring or liner distress and no stuck rings are allowed.

Based upon the time period in which a test completed, an appropriate severity adjustment factor may be added to the test result. For a first test run, the adjusted results are compared to the first test limits below. For a two- or three-test program, the average of the adjusted test results are compared to the appropriate pass limits.

	1st Test	2nd Test	3rd Test
WDP	350	378	390
TGC	36	39	41
TLC	40	46	49
Avg. OC g/h	12.4	12.4	12.4
EOTOC, g/h	14.6	14.6	14.6

