



DE126346

Caterpillar 1-R Test Method

SPECIFICATIONS

This test is part of specification DHD-I and proposed for CI-4.

OBJECTIVE

The objective of this test is to evaluate the performance of crankcase lubricants with respect to piston deposits, oil control, and scuffing resistance for ferrous pistons.

FIELD SERVICE SIMULATED

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

TEST FIXTURE

The 1-R test is run in a high-speed four-stroke cycle Caterpillar 1Y3700 single cylinder test engine. The 1Y3700 test engine is equipped with the following features: two piece articulated piston with steel crown and aluminum skirt, mid-supported low distortion cylinder liner, gear driven overhead cam, high pressure electronically controlled fuel injection system, and a high temperature oil system.

TEST PARAMETERS

Test parameters are: 1800 rpm, 68 kW, 240 g/min fuel rate, 120°C oil temperature, 105° C coolant temperature, 60°C air temperature at 292 kPa and 17.8 g/kg water vapor for 504 hours. Fuel timing: 6° BTC.

TEST PARTS

Test parts include: liner (1Y3805), Piston Crown (145-6744), Piston Skirt (132-6663), Top ring (132-6662), 2nd ring (139-9126), Oil ring (7E2990), Cooling jet (1Y4011), Jet aim fixture (1Y3980), ECM 13 deg chip (154-8353).

TEST FUEL

Phillips fuel with a sulfur specification of 0.03 - 0.05 mass % and an API gravity specification of 32 - 36° is used for this test.

TEST PARTS EVALUATED

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

LUBRICANT ANALYSIS

Lubricant analysis includes viscosity, TBN, TAN, wear metals, and fuel dilution.

PASS/FAIL CRITERIA

For DHD-I: No piston, ring, liner distress or stuck rings are allowed.

Requirement	1st Test	2nd Test	3rd Test
WDR	397	416	440
TGC	40	42	44
TLC	37	42	46
Initial OC g/h	13.1	13.1	13.1
EOTOC, g/h	1.5 x Initial	1.5 x Initial	1.5 x Initial



MILD

DE133494



SEVERE

DE134182

