DE126346

# Caterpillar 1-R Test Method

## SPECIFICATIONS

This test is part of specification DHD-1 and proposed for CI-4 & ECF-2.

## 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 (1Y3997), Piston Crown (1Y4016), Piston Skirt (1Y4015),Top ring (1Y4014), 2nd ring (1Y4013), Oil ring (1Y4012), 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 C14: No piston, ring, liner distress or stuck rings are allowed.

| Requirement | 1st Test |
|---|---|
| WDR | 382 |
| TGC | 52 |
| TLC | 31 |
| Initial OC g/h | 13.1 |
| EOTOC, g/h | Initial + 1.8 |

DE133494

**MILD**

DE134182

**SEVERE**