

Caterpillar 1P Engine Lubricant Test (ASTM D6681)



Test Engine

The test is a Caterpillar 1Y3700 electronically controlled, direct fuel injection, in-head camshaft, single cylinder diesel engine with a four- valve cylinder head, 2.4 L articulated two piece piston engine. The test requires an independent compressed inlet air system with controlled temperature and humidified air.

Test Operation

Engine operates for 360 hours steady state operating conditions at 1800 RPM to evaluate the oil's performance towards oil consumption, piston deposits, piston rings, and liner distress. Specified PC-9 HS test fuel is 0.04% mass fuel sulfur is used.

Oil Specifications

API: CH-4, CI-4

Caterpillar: ECF-2

Pass/Fail Determination*

	1 Test	2 Test	3 Test
Average Oil Consumption (g/h max)	12.4		
Final Oil Consumption (g/h max)	14.6		
Top Land Carbon (% max)	40	46	49
Top Groove Carbon (% max)	36	39	41
Weighted Total Deposits (demerits max)	350	378	390
Piston Rings and Liner Scuffing	None		

*As specified by ASTM D4485

**For more information,
please contact:**

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Engine Test	Cat 1P	
Manufacturer	Caterpillar Inc. Bore X Stroke, 137.2mm x 165.1mm 2.4L, Single Cylinder Two-piece (Articulated) Steel Piston with Aluminum Skirt	
Total Piston Height	128.32mm	
Top Crown to Center Pin Bore	90.37mm	
Crownland Configuration	Radial Crownland to Liner Clearance 0.2369mm	
Piston Rings	Type	Groove Widths
Top Ring	Keystone	3.92mm
Second Ring	Positive Twist Half Keystone w/ Inside Step	3.20mm
Oil Ring	Rectangular	3.20mm
Land Widths		
Crownland	9.90mm	
Second	6.27mm	
Third	4.04mm	

Parameters	Operating Conditions	Units
Test Duration	360	Hours
Speed	1800 ± 3	r/min
Power	55	kW
Torque	285	nM
Fuel Flow	185 ± 1	g/min
Humidity	17.8 ± 1.7	g/kg
Temperatures		
Coolant Out	90 ± 3	DegC
Coolant In	86	DegC
Oil to Bearing	130 ± 3	DegC
Oil Cooler Inlet	128	DegC
Inlet Air	60 ± 3	DegC
Exhaust	480	DegC
Fuel at Injector Housing	42 ± 3	DegC
Pressures		
Oil to Bearing	415 ± 20	kPa
Inlet Air	272 ± 1	kPa
Exhaust	265 ± 1	kPa
Fuel from Head	275 ± 20	kPa
Crankcase	0.1	kPa
Coolant at Cylinder	81	kPa
Flows		
Blowby	35	L/min
Coolant Flow	75 ± 2	L/min
Air Flow	315	kg/h

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