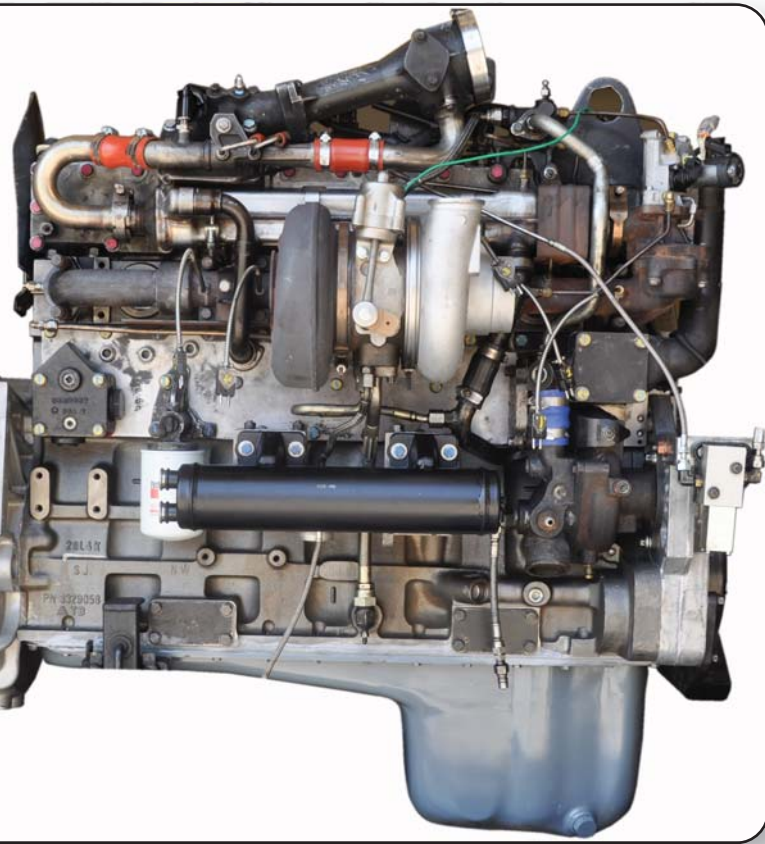


Cummins ISM Engine Lubricant Test (ASTM D7468)



Test Engine

The test uses a 2002 Cummins ISM 500 HP engine, VGT (Variable Geometry Turbocharger), and cooled EGR. This in-line six cylinder 11L engine equipped with electronic fuel injection, and overhead valve train.

Test Operation

Operate engine for 200 hours in four 50 hour stages. Stages A and B test conditions operate at 1800 RPM at rated power with retarded fuel injection timing to generate soot, and stages B and D test conditions operate at 1600 RPM at peak torque to promote and evaluate wear to the injector adjusting screws, crossheads, and top piston ring. Specified PC-9 HS test fuel is 0.04% mass fuel sulfur is used.

Oil Specifications

API:

CH-4, CI-4, CI-4 Plus, CJ-4, CK-4, and FA-4

ACEA:

E7 and E9

Cummins:

CES-20081

Pass/Fail Determination*

	CH-4	CI-4	CJ-4
Crosshead Weight Loss Limits	7.5mg max.	7.5mg max.	7.1mg max.
Adjusting Screw Weight Loss Limits			49mg max.
Top Piston Ring Weight Loss Limit			100mg max.
Average Sludge	8.1 min	8.1 min.	8.7 min.
Oil Filter Delta P	79 max.	55 max.	19 max.
Merits			1000 min.

*As Specified by ASTM D4485

For more information,
please contact:
Intertek Automotive Research Services
+1 (210) 684-2310
intertek.com/automotive

Cummins ISM Lubricant Engine Test (ASTM D7468)



Engine Test	ISM	
Manufacturer	Cummins Bore X Stroke, 125.0 mm x 147.0 mm 10.8L, 2002 Inline six Cylinder Two Piece (Articulated) Steel Piston Aluminum Skirt	
Total Piston Height	112.86 mm	
Top crown to center Pin Bore	74.15 mm	
Crownland Configuration	Radial Crownland to Liner Clearance 0.752 mm	
Piston Rings	Type	Groove Widths
Top Ring	Positive Twist Keystone w/Inside Step	3.10 mm
Second Ring	Negative Twist Keystone w/ Inside Step	2.85 mm
Oil Ring	Rectangular	3.96 mm
Land Widths		
Crownland	6.10 mm	
Second	9.60 mm	
Third	2.91 mm	

Parameters	Operating Conditions				Units
	Stage A	Stage B	Stage C	Stage D	
Test Duration	50	50	50	50	Hours
Speed	1800 ± 5	1600 ± 5	1800 ± 5	1600 ± 5	r/min
Torque	1220	1830	1220	1830	Nm
Fuel Flow	58 ± 1	64.4 ± 1	58 ± 1	64.4 ± 1	kg/h
Intake CO ₂	0.97-1.09	0.97-1.09	0.97-1.09	0.97-1.09	%
Temperatures					
Coolant Out	65.5 ± 2	65.5 ± 2	65.5 ± 2	65.5 ± 2	DegC
Intake Manifold	80	65.5	80	65.5	DegC
Oil Gallery	115 ± 2	115 ± 2	115 ± 2	115 ± 2	DegC
Fuel In	40 ± 2	40 ± 2	40 ± 2	40 ± 2	DegC
Pressures					
Intake Manifold	≥300	≥320	≥300	>320	kPaA
Coolant System (Expansion Tank)	103 ± 4	103 ± 4			kPa
Exhaust	107 ± 1	107 ± 1	107 ± 1	107 ± 1	kPaA

For more information,
please contact:
Intertek Automotive Research Services
+1 (210) 684-2310
intertek.com/automotive