

**Sequence IIIFHD
Test Report**

Version

Conducted For

	V = Valid
	I = Invalid
	N = Results Cannot Be Interpreted As Representative Of Oil Performance (Non-Reference Oil) And Shall Not Be Used For Multiple Test Acceptance

	NR = Non-reference oil
	RO = Reference oil

Test Number					
Test Stand		Stand Test Number		Lab Run Number	
Oil Code:					
Formulation/Stand Code					
Alternate Codes					
EOT Date		EOT Time			

<p>In my opinion this test _____ been conducted in a valid manner in accordance with the latest draft of the Sequence IIIFHD procedure and the appropriate amendments through the Information Letter System. The remarks included in this report describe anomalies associated with this test.</p>
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Submitted By: _____
Testing Laboratory

Signature

Typed Name

Title

**Sequence III FHD
Form 2**

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^A ACC Conformance Statement is required only for ACC registered tests.

**Sequence IIIFHD
Form 3**

Summary of Test Method

The Sequence IIIFHD Test is a fired-engine, dynamometer lubricant test for evaluating automotive engine oils for certain high-temperature performance characteristics, including oil thickening, varnish deposition, oil consumption, and engine wear. Such oils include both single viscosity grade and multi-viscosity grade oils that are used in spark-ignition, gasoline-fueled engines, as well as diesel engines.

The Sequence IIIFHD Test utilizes a 1996 General Motors Powertrain 3800 Series II, water-cooled, 4 cycle, V-6 engine as the test apparatus. The Sequence IIIFHD test engine is an overhead valve design (OHV) and uses a single camshaft operating both intake and exhaust valves via pushrods and hydraulic valve lifters in a sliding-follower arrangement. The engine uses one intake and one exhaust valve per cylinder. Induction is handled by a modified GM port fuel injection system setting the Air-to-Fuel ratio at 15:1. The test engine is overhauled prior to each test, during which critical engine dimensions are measured and rated or measured parts (pistons, camshaft, valve lifters, etc.) are replaced.

The Sequence IIIFHD Test consists of a 10-minute operational check, followed by 60 hours of engine operation at moderately high speed, load, and temperature conditions. The 60-hour segment is broken down into six 10-hour test segments. Following each 10-hour segment, and the 10-minute operational check, oil samples are drawn from the engine. The kinematic viscosities of the 10-hour segment samples are compared to the viscosity of the 10-minute sample to determine the viscosity increase of the test oil.

The Sequence IIIFHD Test is operated at the following test states during the 60-hour portion of the test:

Parameter	Set Point
Engine Speed	3600 r/min
Engine Load	200 N·m
Oil Filter Block Temperature	155 °C
Coolant Outlet Temperature	122 °C
Fuel Pressure	365 kPa
Intake Air Temperature	27 °C
Intake Air Pressure	0.05 kPa
Intake Air Dew Point	16.1 °C
Exhaust Back Pressure	6 kPa
Engine Coolant Flow	160 L/min
Condenser Coolant Flow	10 L/min
Air-to-Fuel Ratio	15.0:1
Condenser Coolant Outlet Temperature	40 °C

**Sequence IIFHD
Form 4**

Test Result Summary

Laboratory		Oilcode	
Test Stand No.		Test No.	
Laboratory Oil Code			
Formulation Stand Code			

Date Started		Engine No.	
Time Started		Fuel Batch	
Date Completed		SAE Viscosity	
Time Completed		TMC Oil Code ^A	
Test Length			

Pass/Fail Results	
	Viscosity Increase (%)
Original Units	
Transformed Results	
Industry Correction Factor	
Corrected Transformed Result	
Severity Adjustment	
Final Transformed Result	
Final Original Unit Result	

Additional Results			
Oil Consumption Hours, h ^B		Oil Consumption (L)	

^A Reference Oil Tests Only

^B Test Hours at which Oil Consumption was calculated

**Sequence IIIFHD
Form 5
Operational Summary**

Laboratory		Oilcode	
Test Stand No.		Test No.	
Laboratory Oil Code			
Formulation Stand Code			

Controlled Parameters	Parameter	Units	QI Limit	EOT QI	Target	Average	Standard Deviation	Number of	
								Samples ^A	BQD ^B
Speed	r/min	0.000			3600				
Load	N·m	0.000			200				
Oil Filter Block	°C	0.000			155.0				
Engine Coolant Out	°C	0.000			122.0				
Condenser Coolant Out	°C	0.000			40.0				
Left Air-to-Fuel Ratio	-	0.000			15.0				
Right Air-to-Fuel Ratio	-	0.000			15.0				
Left Exhaust Back Pressure	kPa	0.000			6.0				
Right Exhaust Back Pressure	kPa	0.000			6.0				
Intake Air	kPa	0.000			0.05				
Engine Coolant Flow	L/min	0.000			160.0				

Non-controlled Parameters	Parameter	Units	Average	Standard Deviation	Number of	
					Samples ^A	BQD ^B
Oil Sump	°C					
Pump Outlet Pressure	kPa					
Gallery Pressure	kPa					
Engine Coolant In	°C					
Fuel Inlet	°C					
Intake Air	°C					
Intake Air Dew Point	°C					
Intake Vacuum	kPa					
Crankcase	kPa					
Fuel Pressure	kPa					

Oil Consumption Data							
HOURS	Initial Run-in						
LEVEL (ml) low							

NOx Measurement		
Hours		
NO _x , ppm		

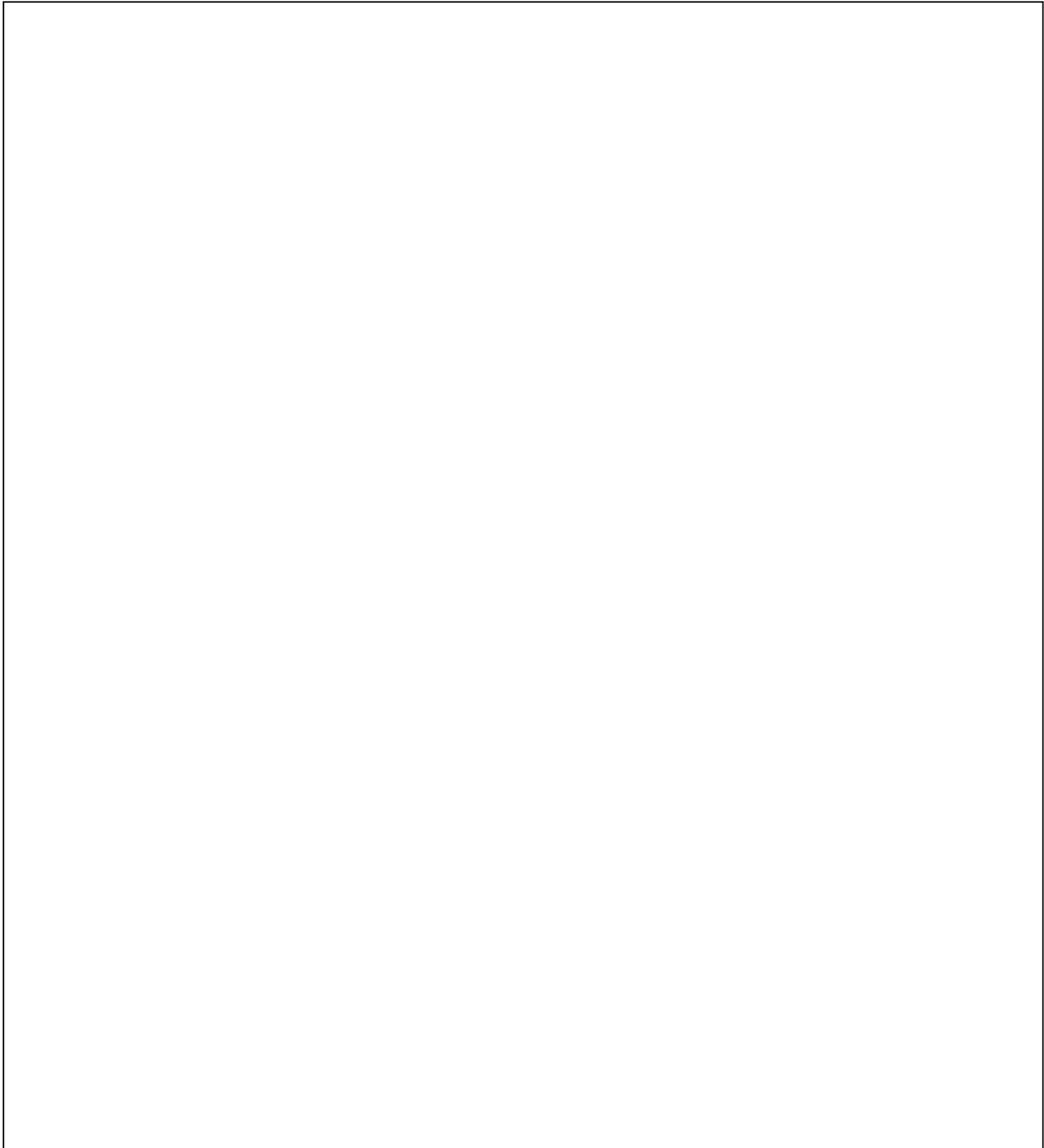
^A Total Number of data points taken as determined from test length and sampling rate

^B Number of Bad Quality Data points not used in the calculation of statistical measures

**Sequence IIFHD
Form 8**

Viscosity Increase Plot

Laboratory		Oilcode	
Test Stand No.		Test No.	
Laboratory Oil Code			
Formulation Stand Code			



**Sequence IIFHD
Form 9**

Hardware Information

Lab		Oil Code	
Stand		Test No.	
Laboratory Oil Code			
Formulation Stand Code			

FIFO	Piston Ring Batch Code		Build Completion Date	
FIFO	Oil Control (OC) Batch Code		Piston Size (Grade)	
FIFO	Expander Ring (EXP) Batch Code		Block Serial Number	
FIFO	Oil Filter Batch Code		Crankshaft Serial Number	
FIFO	Camshaft Pour Code		Crankshaft Part Number	
FIFO	Oil Cooler Batch Code		Camshaft Serial Number	
FIFO	Valve Springs Batch Code		Cylinder Head Serial Number, Left	
FIFO	Intake Valve Seals Batch Code		Cylinder Head Serial Number, Right	
FIFO	Exhaust Valve Seals Batch Code		Top Ring Gap, mils	
FIFO	Main Bearings (M) Batch Code		Bottom Ring Gap, mils	
FIFO	Connecting Rod Bearings (CR) Batch Code		Bearing Kit Serial Number	
FIFO	Camshaft Bushing (CB) Batch Code			
FIFO	Piston Batch (Code)			

**Sequence IIIFHD
Form 11
American Chemistry Council Code Of Practice
Test Laboratory Conformance Statement**

Test Laboratory				
Test Sponsor				
Formulation / Stand Code				
Test Number				
Start Date		Start Time		Time Zone

Declarations

No. 1 All requirements of the ACC Code of Practice for which the test laboratory is responsible were met in the conduct of this test. Yes _____ No _____ *

No. 2 The laboratory ran this test for the full duration following all procedural requirements; and all operational validity requirements of the latest version of the applicable test procedure (ASTM or other), including all updates issued by the organization responsible for the test, were met.
Yes _____ No _____ *

If the response to this Declaration is “No”, does the test engineer consider the deviations from operational validity requirements that occurred to be beyond the control of the laboratory? Yes _____ * No _____

No 3. A deviation occurred for one of the test parameters identified by the organization responsible for the test as being a special case. Yes _____ * No _____ (*This currently applies only to specific deviations identified in the ASTM Information Letter System*)

Check The Appropriate Conclusion

	Operational review of this test indicates that the results should be included in the Multiple Test Acceptance Criteria calculations.
	*Operational review of this test indicates that the results should not be included in the Multiple Test Acceptance Criteria calculations.

Note: *Supporting comments are required for all responses identified with an asterisk.*

<i>Comments</i>

Signature

Date

Typed Name

Title