Sequence IIIFHD
Test Report

Version IIIFHD VERSION 20080521 BETA

Conducted For

TSTSPON1
TSTSPON2

LABVALID	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

TSTOIL	NR = Non-reference oil
	RO = Reference oil

Test Number					
Test Stand	STAND	Stand Test Number	STRUN	Lab Run Number	LABRUN
Oil Code:	OILCODE				
Formulation/Stand Code	FORM				
Alternate Codes	ALTCODE1	ALTCODE2	ALTCODE3		
EOT Date	DTCOMP	EOT Time	EOTTIME		

In my opinion this test OPVALID 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.

Submitted By:

SUBLAB
Testing Laboratory

SUBSIGIM
Signature

SUBNAME
Typed Name

SUBTITLE
Title

Sequence IIIFHD
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 IIIFHD
Form 4

Test Result Summary

Laboratory	LAB	Oilcode	OILCODE
Test Stand No.	STAND	Test No.	TESTNUM
Laboratory Oil Code	LABOCODE		
Formulation Stand Code	FORM		

Date Started	DTSTRT	Engine No.	ENGINENO
Time Started	STRTTIME	Fuel Batch	FUELBTID
Date Completed	DTCOMP	SAE Viscosity	SAEVISC
Time Completed	EOTTIME	TMC Oil Code[A]	IND
Test Length	TESTLEN		

Pass/Fail Results	
	Viscosity Increase (%)
Original Units	PVIS
Transformed Results	TPVIS
Industry Correction Factor	PVIS_CF
Corrected Transformed Result	PVIS_COR
Severity Adjustment	PVIS_SA
Final Transformed Result	TPVISFNL
Final Original Unit Result	PVISFNL

Additional Results			
Oil Consumption Hours, h [B]	OCONHR	Oil Consumption (L)	OILCON

[A] Reference Oil Tests Only

[B] Test Hours at which Oil Consumption was calculated

Sequence IIIFHD
Form 5

Operational Summary

Laboratory	LAB	Oilcode	OILCODE
Test Stand No.	STAND	Test No.	TESTNUM
Laboratory Oil Code		LABOCODE	
Formulation Stand Code		FORM	

	Parameter	Units	QI Limit	EOT QI	Target	Average	Standard Deviation	Number of	
								Samples[A]	BQD[B]
Controlled Parameters	Speed	r/min	0.000	QRPM	3600	ARPM	SRPM	NRPM	BRPM
	Load	N·m	0.000	QLOAD	200	ALOAD	SLOAD	NLOAD	BLOAD
	Oil Filter Block	°C	0.000	QOTEMP	155.0	AOTEMP	SOTEMP	NOTEMP	BOTEMP
	Engine Coolant Out	°C	0.000	QCOLOUT	122.0	ACOLOUT	SCOLOUT	NCOLOUT	BCOLOUT
	Condenser Coolant Out	°C	0.000	QCCOLOUT	40.0	ACCOLOUT	SCCOLOUT	NCCOLOUT	BCCOLOUT
	Left Air-to-Fuel Ratio	-	0.000	QLAFR	15.0	ALAFR	SLAFR	NLAFR	BLAFR
	Right Air-to-Fuel Ratio	-	0.000	QRAFR	15.0	ARAFR	SRAFR	NRAFR	BRAFR
	Left Exhaust Back Pressure	kPa	0.000	QLEXBP	6.0	ALEXBP	SLEXBP	NLEXBP	BLEXBP
	Right Exhaust Back Pressure	kPa	0.000	QREXBP	6.0	AREXBP	SREXBP	NREXBP	BREXBP
	Intake Air	kPa	0.000	QINAIR	0.05	AINAIR	SINAIR	NINAIR	BINAIR
	Engine Coolant Flow	L/min	0.000	QCOLFLO	160.0	ACOLFLO	SCOLFLO	NCOLFLO	BCOLFLO

	Parameter	Units	Average	Standard Deviation	Number of	
					Samples[A]	BQD[B]
Non-controlled Parameters	Oil Sump	°C	AOSUMP	SOSUMP	NOSUMP	BOSUMP
	Pump Outlet Pressure	kPa	APOUTP	SPOUTP	NPOUTP	BPOUTP
	Gallery Pressure	kPa	AOILPRS	SOILPRS	NOILPRS	BOILPRS
	Engine Coolant In	°C	AECOLIN	SECOLIN	NECOLIN	BECOLIN
	Fuel Inlet	°C	AFUELIN	SFUELIN	NFUELIN	BFUELIN
	Intake Air	°C	AINAT	SINAT	NINAT	BINAT
	Intake Air Dew Point	°C	AINDEW	SINDEW	NINDEW	BINDEW
	Intake Vacuum	kPa	AINVAC	SINVAC	NINVAC	BINVAC
	Crankcase	kPa	ACCASEP	SCCASEP	NCCASEP	BCCASEP
	Fuel Pressure	kPa	APFUEL	SPFUEL	NPFUEL	BPFUEL

Oil Consumption Data							
HOURS	Initial Run-in	OCONH0	OCONH0	OCONH0	OCONH0	OCONH0	OCONH0
LEVEL (ml) low	OILLINI	OILLH01	OILLH02	OILLH03	OILLH04	OILLH05	OILLH06

NOx Measurement		
Hours	NOXHH007	NOXHH039
NO_X, ppm	NOX_H007	NOX_H039

[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 IIIFHD
Form 6

Used Oil Analysis Results

Laboratory	LAB	Oilcode	OILCODE
Test Stand No.	STAND	Test No.	TESTNUM
Laboratory Oil Code	LABOCODE		
Formulation Stand Code	FORM		

Viscosity Increase Data (cSt @ 40°C)			
Hours	**Viscosity[A]**	**Change**	**Percent**
New Oil	VNEW		
Initial[B]	VINI		
VISTH01(	VIS_H010	DVISH010	PVISH010
VISTH02(	VIS_H020	DVISH020	PVISH020
VISTH03(	VIS_H030	DVISH030	PVISH030
VISTH04(	VIS_H040	DVISH040	PVISH040
VISTH05(	VIS_H050	DVISH050	PVISH050
VISTH06(	VIS_H060	DVISH060	PVISH060
TESTLEN	VISEOT	DVISEOT	PVIS

[A] 8000 cSt is maximum allowable viscosity
[B] At end of leveling run

Results of ICP Analysis of Used Oil								
Test Hours	Initial	TST_H01(	TST_H020	TST_H03	TST_H04	TST_H050	TST_H060	TESTLEN
Iron	FEWMINI	FEWMH0	FEWMH02	FEWMH(	FEWMH(	FEWMH0	FEWMH06	FEWMEOT
Copper	CUWMINI	CUWMH(	CUWMH0	CUWMH	CUWMH	CUWMH(	CUWMH0	CUWMEOT
Lead	PBWMINI	PBWMH0	PBWMH02	PBWMH(	PBWMH	PBWMH0	PBWMH06	PBWMEOT

Sequence IIIFHD
Form 7

Blowby Values & Plot

Laboratory	LAB	Oilcode	OILCODE
Test Stand No.	STAND	Test No.	TESTNUM
Laboratory Oil Code	LABOCODE		
Formulation Stand Code	FORM		

Blowby Plot

BLOWBYIM

Test Hours	BBYTH0(	BBYTH0(	BBYTH0	BBYTH01	BBYTH0[illegible]	BBYTH0[illegible]	BBYTH0[illegible]	BBYTH0[illegible]	BBYTH0[illegible]	BBYTH0[illegible]
Blowby, L/min	BLWBH0(	BLWBH0	BLWBH0	BLWBH0	BLWBH0	BLWBH0	BLWBH0	BLWBH0	BLWBH0	BLWBH0
Test Hours	BBYTH05	BBYTH0[illegible]								**Average**
Blowby, L/min	BLWBH0[illegible]	BLWBH0								ABLOBY

Sequence IIIFHD
Form 8

Viscosity Increase Plot

Laboratory	LAB	Oilcode	OILCODE		
Test Stand No.	STAND	Test No.	TESTNUM		
Laboratory Oil Code	LABOCODE				
Formulation Stand Code	FORM				

VISINIM

Sequence IIIFHD
Form 9

Hardware Information

Laboratory	LAB	Oilcode	OILCODE
Test Stand No.	STAND	Test No.	TESTNUM
Laboratory Oil Code	LABOCODE		
Formulation Stand Code	FORM		

Build Completion Date	BUILDDT	Piston Batch (Code)	PISTBAT
Block Serial Number	BLOCKSN	Piston Size (Grade)	PISTSIZE
Crankshaft Serial Number	CRANKSN	Piston Ring Batch Code	RINGCODE
Camshaft Serial Number	CAMSN	Oil Filter Batch Code	OILFIBAT
Cylinder Head Serial Number, Left	LHEADSN	Intake Valve Seals Batch Code	INVSLBAT
Cylinder Head Serial Number, Right	RHEADSN	Valve Springs Batch Code	VALSPBAT
Bearing Kit Serial Number	BRNGSN		
Top Ring Gap, mils	TRINGGAP		
Bottom Ring Gap, mils	BRINGGAP		

Sequence IIIFHD
Form 10

Downtime & Outlier Report Form

Lab	LAB	Oil Code	OILCODE
Stand	STAND	Test No.	TESTNUM
Laboratory Oil Code		LABOCODE	
Formulation Stand Code		FORM	

Number of Downtime Occurrences	DWNOCR	
Test Hours	**Date**	**Downtime**	**Reasons**
DOWNR00	DDATR001	DTIMR001	DREAR001
DOWNR00	DDATR002	DTIMR002	DREAR002
DOWNR00	DDATR003	DTIMR003	DREAR003
DOWNR00	DDATR004	DTIMR004	DREAR004
DOWNR00	DDATR005	DTIMR005	DREAR005
DOWNR00	DDATR006	DTIMR006	DREAR006
DOWNR00	DDATR007	DTIMR007	DREAR007
DOWNR00	DDATR008	DTIMR008	DREAR008
DOWNR00	DDATR009	DTIMR009	DREAR009
DOWNR01	DDATR010	DTIMR010	DREAR010
DOWNR01	DDATR011	DTIMR011	DREAR011
DOWNR01	DDATR012	DTIMR012	DREAR012
DOWNR01	DDATR013	DTIMR013	DREAR013
DOWNR01	DDATR014	DTIMR014	DREAR014
DOWNR01	DDATR015	DTIMR015	DREAR015
		TOTLDOWN	**Total Downtime (hours) – Maximum allowable downtime: 24 hours**

Other Comments		
Number of Comment Lines	TOTCOM	
OCOMR001		
OCOMR002		
OCOMR003		
OCOMR004		
OCOMR005		
OCOMR006		
OCOMR007		
OCOMR008		
OCOMR009		
OCOMR010		
OCOMR011		
OCOMR012		
OCOMR013		
OCOMR014		
OCOMR015		

Sequence IIIFHD
Form 10A

Downtime & Outlier Report Form

Lab	LAB	Oil Code	OILCODE
Stand	STAND	Test No.	TESTNUM
Laboratory Oil Code		LABOCODE	
Formulation Stand Code		FORM	

Number of Downtime Occurrences		DWNOCR	
Test Hours	**Date**	**Downtime**	**Reasons**
DOWNR016	DDATR016	DTIMR016	DREAR016
DOWNR017	DDATR017	DTIMR017	DREAR017
DOWNR018	DDATR018	DTIMR018	DREAR018
DOWNR019	DDATR019	DTIMR019	DREAR019
DOWNR020	DDATR020	DTIMR020	DREAR020
DOWNR021	DDATR021	DTIMR021	DREAR021
DOWNR022	DDATR022	DTIMR022	DREAR022
DOWNR023	DDATR023	DTIMR023	DREAR023
DOWNR024	DDATR024	DTIMR024	DREAR024
DOWNR025	DDATR025	DTIMR025	DREAR025
DOWNR026	DDATR026	DTIMR026	DREAR026
DOWNR027	DDATR027	DTIMR027	DREAR027
DOWNR028	DDATR028	DTIMR028	DREAR028
DOWNR029	DDATR029	DTIMR029	DREAR029
DOWNR030	DDATR030	DTIMR030	DREAR030
		TOTLDOWN	**Total Downtime (hours) – Maximum allowable downtime: 24 hours**

Other Comments		
Number of Comment Lines	TOTCOM	
OCOMR016		
OCOMR017		
OCOMR018		
OCOMR019		
OCOMR020		
OCOMR021		
OCOMR022		
OCOMR023		
OCOMR024		
OCOMR025		
OCOMR026		
OCOMR027		
OCOMR028		
OCOMR029		
OCOMR030		

Sequence IIIFHD
Form 10B

Downtime & Outlier Report Form

Lab	LAB	Oil Code	OILCODE
Stand	STAND	Test No.	TESTNUM
Laboratory Oil Code		LABOCODE	
Formulation Stand Code		FORM	

Number of Downtime Occurrences		DWNOCR	
Test Hours	**Date**	**Downtime**	**Reasons**
DOWNR031	DDATR031	DTIMR031	DREAR031
DOWNR032	DDATR032	DTIMR032	DREAR032
DOWNR033	DDATR033	DTIMR033	DREAR033
DOWNR034	DDATR034	DTIMR034	DREAR034
DOWNR035	DDATR035	DTIMR035	DREAR035
DOWNR036	DDATR036	DTIMR036	DREAR036
DOWNR037	DDATR037	DTIMR037	DREAR037
DOWNR038	DDATR038	DTIMR038	DREAR038
DOWNR039	DDATR039	DTIMR039	DREAR039
DOWNR040	DDATR040	DTIMR040	DREAR040
DOWNR041	DDATR041	DTIMR041	DREAR041
DOWNR042	DDATR042	DTIMR042	DREAR042
DOWNR043	DDATR043	DTIMR043	DREAR043
DOWNR044	DDATR044	DTIMR044	DREAR044
DOWNR045	DDATR045	DTIMR045	DREAR045
		TOTLDOWN	**Total Downtime (hours) – Maximum allowable downtime: 24 hours**

Other Comments		
Number of Comment Lines		TOTCOM
OCOMR031		
OCOMR032		
OCOMR033		
OCOMR034		
OCOMR035		
OCOMR036		
OCOMR037		
OCOMR038		
OCOMR039		
OCOMR040		
OCOMR041		
OCOMR042		
OCOMR043		
OCOMR044		
OCOMR045		

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

Test Laboratory	SUBLAB				
Test Sponsor	TSTSPON1				
Formulation / Stand Code	FORM				
Test Number	TESTNUM				
Start Date	DTSTRT	Start Time	STRTTIME	Time Zone	TZONE

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 YESRQM No NORQMI*

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 YESFULL No NOFULL *

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 YESNODE* No NONODEC

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 YESDEV* No NODEV *(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.
DNINCLUDEC	*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.*

Comments
ACCCOMM1
ACCCOMM2
ACCCOMM3
ACCCOMM4

SUBSIGIM
Signature

SUBDATE
Date

SUBNAME
Typed Name

SUBTITLE
Title