Report On
Sequence IIIHB Evaluation
Version
IIIHB VERSION 20160603 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 test
	RO = Reference oil test

Test Number					
Test Stand	STAND	Stand Test	STRUN	Lab Test	LABRUN
Oil Code	OILCODE				
Formulation/Stand	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 Test Method, D XXXX, and appropriate amendments. The remarks included in the report describe the anomalies associated with this test.

Submitted By:

SUBLAB
Testing Laboratory

SUBSIGIM
Signature

SUBNAME
Typed Name

SUBTITLE
Title

Sequence IIIHB
Form 2
Table of Contents

Sequence IIIHB
Form 3
Summary of Test Method

The Sequence IIIHB Test is a fired-engine, dynamometer lubricant test for evaluating automotive engine oils for certain high-temperature performance characteristics. 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 IIIHB Test utilizes a 2012 Chrysler Penstar 3.6 Liter, water-cooled, 4 cycle, V-6 engine as the test apparatus. The Sequence IIIHB test engine is an overhead valve design (OHV) and uses dual overhead camshafts operating both intake and exhaust valves. The engine uses two intake and two exhaust valve per cylinder. The test engine is overhauled prior to each test, during which critical engine dimensions are measured and rated or measured parts (pistons, rings, etc.) are replaced.

The Sequence IIIHB Test consists 90 hours of engine operation at moderately high speed, load, and temperature conditions. The 90-hour segment is broken down into four 20-hour test segments and one 10-hour segment. Following each 20-hour segment, the 10 hour segment, and the 10-minute operational check, oil samples are drawn from the engine. The ICP analysis of the 20-hour segment samples and 10 hour segment samples are compared to the ICP analysis of the initial sample to determine the phosphorus retention of the test oil.

The Sequence IIIHB Test is operated at the following test states during the 90-hour portion of the test:

Parameter	Set Point
Engine Speed	3900 r/min
Engine Load	250 N·m
Oil Temperature, Block	151°C
Coolant Outlet Temperature	115°C
Fuel Temperature	30 °C
Intake Air Temperature	35 °C
Intake Air Pressure	0.05 kPa
Intake Air Dew Point	16.1 °C
Exhaust Back Pressure	4.5 kPa
Engine Coolant Flow	170 L/min
Coolant Pressure	200 kPa

Sequence IIIHB
Form 4

Test Result Summary

Lab	LAB	Oil Code	OILCODE
Stand	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	Reference Oil [A]	IND
Test Length	TESTLEN		

	Phosphorus Retention
Original Units	PHOS
Transformed Results[B]	TPHOS
Industry Correction Factor	PHOSCF
Corrected Transformed Result	PHOSCOR
Severity Adjustment	PHOSSA
Final Transformed Result	TPHOSFNL
Final Original Unit Result	PHOSFNL

Additional Results

Oil Consumption Hours, h [B]	OCONHRS	Oil Consumption, L	OILCON

[A] *Reference Oil Tests Only*

[B] *Test Hours at which Oil Consumption was calculated*

Sequence IIIHB
Form 5
Operational Summary

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

	Parameter	Units	QI Threshold	EOT QI	Target	Average	Standard Deviation	Number of Samples	Number of BQD
Controlled Parameters	Speed	r/min	0.000	QRPM	3900	ARPM	SRPM	NRPM	BRPM
	Load	N·m	0.000	QLOAD	250	ALOAD	SLOAD	NLOAD	BLOAD
	Oil, Block	°C	0.000	QOTEMP	151	AOTEMP	SOTEMP	NOTEMP	BOTEMP
	Coolant Out	°C	0.000	QCOLOUT	115	ACOLOUT	SCOLOUT	NCOLOUT	BCOLOUT
	Coolant System	kPa			200	ACOLSP	SCOLSP	NCOLSP	BCOLSP
	Intake Air	°C	0.000	QINAT	35	AINAT	SINAT	NINAT	BINAT
	Intake Air	kPa	0.000	QINAIR	0.05	AINAIR	SINAIR	NINAIR	BINAIR
	Dew Point	°C	0.000	QINADP	16.1	AINADP	SINADP	NINADP	BINADP
	EBP Rt.	kPa	0.000	QREXBP	4.5	AREXBP	SREXBP	NREXBP	BREXBP
	EBP Lt.	kPa	0.000	QLEXBP	4.5	ALEXBP	SLEXBP	NLEXBP	BLEXBP
	AFR, Rt.				14.4	ARAFR	SRAFR	NRAFR	BRAFR
	AFR, Lt.				14.4	ALAFR	SLAFR	NLAFR	BLAFR
	Fuel @ Rail	°C	0.000	QFUELT	30	AFUELT	SFUELT	NFUELT	BFUELT
	Fuel @ Rail	kPa			420	APFUEL	SPFUEL	NPFUEL	BPFUEL
	Coolant Flow	L/min	0.000	QCOLFLO	170	ACOLFLO	SCOLFLO	NCOLFLO	BCOLFLO

	Parameter	Units	Average	Standard Deviation	Number of Samples	Number of BQD
Non-controlled Parameters	Oil Sump	°C	AOSUMP	SOSUMP	NOSUMP	BOSUMP
	Oil Pump	°C	AOPUMP	SOPUMP	NOPUMP	BOPUMP
	Oil Cooler	°C	AOCOOLER	SOCOOLER	NOCOOLER	BOCOOLER
	Coolant In	°C	AECOLIN	SECOLIN	NECOLIN	BECOLIN
	Oil Gallery	kPa	AOILPRS	SOILPRS	NOILPRS	BOILPRS
	Oil Pump	kPa	APOUTP	SPOUTP	NPOUTP	BPOUTP
	Manifold Absolute Pressure	kPaA	AINMAP	SINMAP	NINMAP	BINMAP
	Right Exhaust Temperature	°C	AREXHTMP	SREXHTMP	NREXHTMP	BREXHTMP
	Left Exhaust Temperature	°C	ALEXHTMP	SLEXHTMP	NLEXHTMP	BLEXHTMP
	Fuel Flow	kg/H	AFUELF	SFUELF	NFUELF	BFUELF
	Crankcase	kPa	ACCASEP	SCCASEP	NCCASEP	BCCASEP
	Right NOx	mg/kg	ANOXRT	SNOXRT	NNOXRT	BNOXRT
	Left NOx	mg/kg	ANOXLT	SNOXLT	NNOXLT	BNOXLT

Sequence IIIHB
Form 6
Oil Consumption Data Plot

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

Oil Consumption Data

Hours	OCONH020	OCONH040	OCONH060	OCONH080	**EOT**
Level low (mL)	OILLH020	OILLH040	OILLH060	OILLH080	OILLEOT
Total Oil Consumed (L)	OILCH020	OILCH040	OILCH060	OILCH080	OILCEOT

Oil Consumption Plot

OILCONIM

Sequence IIIHB

Form 7

Used Oil Analysis Results

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

Oxidation & Nitration Results						
Parameter	**Method**	**Test Hours**				**EOT**
		TST_H020	TST_H040	TST_H060	TST_H080	IRN3EOT
DIR Oxidation	E168 IIIG Area	IRO3H020	IRO3H040	IRO3H060	IRO3H080	IRO3EOT
DIR Nitration	E168 IIIG Area	IRN3H020	IRN3H040	IRN3H060	IRN3H080	IRN3EOT

Total Acid Number						
Parameter	**Method**	TST_H020	TST_H040	TST_H060	TST_H080	**EOT**
TAN	D664	TAN_H020	TAN_H040	TAN_H060	TAN_H080	TANEOT
TBN	D4739	TBN_H020	TBN_H040	TBN_H060	TBN_H080	TBNEOT

Metals Element Analysis – ICP Method D5185 mg/kg							
Element	**New Oil**	**Initial[A]**	TST_H020	TST_H040	TST_H060	TST_H080	**EOT**
Aluminum (Al)	ALWMNEW	ALWMINI	ALWMH020	ALWMH040	ALWMH060	ALWMH080	ALWMEOT
Boron (B)	BWMNEW	BWMINI	B_WMH020	B_WMH040	B_WMH060	B_WMH080	BWMEOT
Calcium (Ca)	CAWMNEW	CAWMINI	CAWMH020	CAWMH040	CAWMH060	CAWMH080	CAWMEOT
Copper (Cu)	CUWMNEW	CUWMINI	CUWMH020	CUWMH040	CUWMH060	CUWMH080	CUWMEOT
Iron (Fe)	FEWMNEW	FEWMINI	FEWMH020	FEWMH040	FEWMH060	FEWMH080	FEWMEOT
Potassium (K)	KWMNEW	KWMINI	K_WMH020	K_WMH040	K_WMH060	K_WMH080	KWMEOT
Magnesium (Mg)	MGWMNEW	MGWMINI	MGWMH020	MGWMH04(	MGWMH06(	MGWMH08(	MGWMEO'
Manganese (Mn)	MNWMNEW	MNWMINI	MNWMH020	MNWMH04(	MNWMH06(	MNWMH08(	MNWMEO'
Molybdenum (Mo)	MOWMNEW	MOWMINI	MOWMH020	MOWMH04(	MOWMH06(	MOWMH08(	MOWMEO'
Sodium (Na)	NAWMNEW	NAWMINI	NAWMH020	NAWMH040	NAWMH060	NAWMH080	NAWMEOT
Phosphorus (P)	PWMNEW	PWMINI	P_WMH020	P_WMH040	P_WMH060	P_WMH080	PWMEOT
Lead (Pb)	PBWMNEW	PBWMINI	PBWMH020	PBWMH040	PBWMH060	PBWMH080	PBWMEOT
Silicon (Si)	SIWMNEW	SIWMINI	SIWMH020	SIWMH040	SIWMH060	SIWMH080	SIWMEOT
Tin (Sn)	SNWMNEW	SNWMINI	SNWMH020	SNWMH040	SNWMH060	SNWMH080	SNWMEOT
Zinc (Zn)	ZNWMNEW	ZNWMINI	ZNWMH020	ZNWMH040	ZNWMH060	ZNWMH080	ZNWMEOT

[A] *Initial = At end of leveling run*

Sequence IIIHB
Form 8
Blowby Values & Plot

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

Blowby Plot

BLOWBYIM

Test Hours	Blowby, L/min	Test Hours	Blowby, L/min	Test Hours	Blowby, L/min
BBYTH001	BLWBH001	BBYTH046	BLWBH046	BBYTH089	BLWBH089
BBYTH006	BLWBH006	BBYTH051	BLWBH051		
BBYTH011	BLWBH011	BBYTH056	BLWBH056	**Average**	ABLOBY
BBYTH016	BLWBH016	BBYTH061	BLWBH061		
BBYTH021	BLWBH021	BBYTH066	BLWBH066		
BBYTH026	BLWBH026	BBYTH071	BLWBH071		
BBYTH031	BLWBH031	BBYTH076	BLWBH076		
BBYTH036	BLWBH036	BBYTH081	BLWBH081		
BBYTH041	BLWBH041	BBYTH086	BLWBH086		

Sequence IIIHB
Form 9
Hardware Information

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

Hardware Information	
Engine Build Date	BUILDDT
Block Serial Number	BLOCKSN
Ring Batch Code	RINGCODE
Oil Control (OC) Ring Batch Code	ORINGBAT
Expander Ring (EXP) Batch Code	ERINGBAT
Cylinder Head Serial Number, Left	CYLHSNLT
Cylinder Head Serial Number, Right	CYLHSNRT
Lab Block Number	LABBLOCK
Piston Batch Code	PISTBAT

Cylinder Bore Measurements								
Cylinder	Transverse				Longitudinal			
	Top	Middle	Bottom	Taper	Top	Middle	Bottom	Taper
2	C2BDTT	C2BDMT	C2BDBT	C2BDTAPT	C2BDTL	C2BDML	C2BDBL	C2BDTAPL
4	C4BDTT	C4BDMT	C4BDBT	C4BDTAPT	C4BDTL	C4BDML	C4BDBL	C4BDTAPL
6	C6BDTT	C6BDMT	C6BDBT	C6BDTAPT	C6BDTL	C6BDML	C6BDBL	C6BDTAPL
1	C1BDTT	C1BDMT	C1BDBT	C1BDTAPT	C1BDTL	C1BDML	C1BDBL	C1BDTAPL
3	C3BDTT	C3BDMT	C3BDBT	C3BDTAPT	C3BDTL	C3BDML	C3BDBL	C3BDTAPL
5	C5BDTT	C5BDMT	C5BDBT	C5BDTAPT	C5BDTL	C5BDML	C5BDBL	C5BDTAPL

Cylinder Bore Measurements					
Cylinder	**Rk**	**Rpk**	**Rvk**	**Rz**	**Mr2**
2	C2SFRK	C2SFRPK	C2SFRVK	C2SFRZ	C2SFMR2
4	C4SFRK	C4SFRPK	C4SFRVK	C4SFRZ	C4SFMR2
6	C6SFRK	C6SFRPK	C6SFRVK	C6SFRZ	C6SFMR2
1	C1SFRK	C1SFRPK	C1SFRVK	C1SFRZ	C1SFMR2
3	C3SFRK	C3SFRPK	C3SFRVK	C1SFRZ	C3SFMR2
5	C5SFRK	C5SFRPK	C5SFRVK	C5SFRZ	C5SFMR2

Sequence IIIHB
Form 10
Downtime Summary

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**
DOWNR001	DDATR001	DTIMR001	DREAR001
DOWNR002	DDATR002	DTIMR002	DREAR002
DOWNR003	DDATR003	DTIMR003	DREAR003
DOWNR004	DDATR004	DTIMR004	DREAR004
DOWNR005	DDATR005	DTIMR005	DREAR005
DOWNR006	DDATR006	DTIMR006	DREAR006
DOWNR007	DDATR007	DTIMR007	DREAR007
DOWNR008	DDATR008	DTIMR008	DREAR008
DOWNR009	DDATR009	DTIMR009	DREAR009
DOWNR010	DDATR010	DTIMR010	DREAR010
DOWNR011	DDATR011	DTIMR011	DREAR011
DOWNR012	DDATR012	DTIMR012	DREAR012
DOWNR013	DDATR013	DTIMR013	DREAR013
DOWNR014	DDATR014	DTIMR014	DREAR014
DOWNR015	DDATR015	DTIMR015	DREAR015
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
		TOTLDOWN	**Total Downtime (hours) – Maximum allowable downtime: 24 hours**

Sequence IIIHB
Form 11
Test Comments

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

Number of Comment Lines	TOTCOM	
OCOMR001		
OCOMR002		
OCOMR003		
OCOMR004		
OCOMR005		
OCOMR006		
OCOMR007		
OCOMR008		
OCOMR009		
OCOMR010		
OCOMR011		
OCOMR012		
OCOMR013		
OCOMR014		
OCOMR015		
OCOMR016		
OCOMR017		
OCOMR018		
OCOMR019		
OCOMR020		
OCOMR021		
OCOMR022		
OCOMR023		
OCOMR024		
OCOMR025		

Sequence IIIHB

Form 12
American Chemistry Council Code of Practice
Test Laboratory Conformance Statement

Test Laboratory	LAB				
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 YESRQM*

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 NONODE(

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)

INCLUDE	Operational review of this test indicates that the results should be included in the Multiple Test Acceptance Criteria calculations.
DONOTINC	*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