Report On
Sequence IIIH70 Evaluation
Version
IIIH70 VERSION 20190430 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	Runs Since Last Calibration	STRUN	Total Runs on Stand	TOTSRUN
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, D8111, 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 IIIH70
Form 2
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Sequence IIIH70
Form 3
Summary of Test Method

The Sequence IIIH70 Test is a fired-engine, dynamometer lubricant test for evaluating automotive engine oils for certain high-temperature performance characteristics, including oil thickening, varnish deposition, and oil consumption. 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 IIIH70 Test utilizes a 2012 Chrysler Pentastar 3.6 Liter, water-cooled, 4 cycle, V-6 engine as the test apparatus. The Sequence IIIH70 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 IIIH70 Test consists 70 hours of engine operation at moderately high speed, load, and temperature conditions. The 70-hour segment is broken down into three 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 kinematic viscosities of the 20-hour segment samples and 10 hour segment samples are compared to the viscosity of the initial sample to determine the viscosity increase of the test oil.

The Sequence IIIH70 Test is operated at the following test states during the 70-hour portion of the test:

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

Sequence IIIH70
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		

Pass/Fail Results			
	Viscosity Increase (%)	**Average Weighted Piston Deposits (merits)**	**Average Piston Varnish (merits)**
Original Units	PVIS	WPD	APV
Transformed Results[B]	TPVIS		
Industry Correction	PVIS_CF	WPD_CF	APV_CF
Corrected	PVIS_COR		
Severity Adjustment[C]	PVIS_SA	WPD_SA	APV_SA
Final Transformed	TPVISFNL		
Final Original Unit	PVISFNL	WPDFNL	APVFNL

Additional Results

Oil Consumption Hours, h [B]	OCONHRS	Oil Consumption, L	OILCON
Average Oil Ring Plugging, %	ORPAVG	Number of Cold-Stuck Rings	CSTUKT
Number of Hot-Stuck Ring	HSTUKT		

[A] *Reference Oil Tests Only*

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

[C] *Apply IIIH Severity Adjustments for these parameters*

Sequence IIIH70
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	ºC	0.000	QOTEMP	151	AOTEMP	SOTEMP	NOTEMP	BOTEMP
	Coolant Out	ºC	0.000	QCOLOUT	115	ACOLOUT	SCOLOUT	NCOLOUT	BCOLOUT
	Coolant System	kPa			200	ACOLSP	SCOLSP	NCOLSP	BCOLSP
	Intake Air	ºC	0.000	QINAT	35	AINAT	SINAT	NINAT	BINAT
	Intake Air	kPa	0.000	QINAIR	0.05	AINAIR	SINAIR	NINAIR	BINAIR
	Dew Point	ºC	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
	Fuel @ Rail	ºC	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	ºC	AOSUMP	SOSUMP	NOSUMP	BOSUMP
	Oil Pump	ºC	AOPUMP	SOPUMP	NOPUMP	BOPUMP
	Oil Cooler (Optional)	ºC	AOCOOLER	SOCOOLER	NOCOOLER	BOCOOLER
	Coolant In	ºC	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	ºC	AREXHTMP	SREXHTMP	NREXHTMP	BREXHTMP
	Left Exhaust Temperature	ºC	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
	AFR, Rt.		ARAFR	SRAFR	NRAFR	BRAFR
	AFR, Lt.		ALAFR	SLAFR	NLAFR	BLAFR

Sequence IIIH70
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	**EOT**
Level low (mL)	OILLH020	OILLH040	OILLH060	OILLEOT
Total Oil Consumed (L)	OILCH020	OILCH040	OILCH060	OILCEOT

Oil Consumption Plot

OILCONIM

Sequence IIIH70

Form 7

Used Oil Analysis Results

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

Viscosity Increase Data (mm^2/s @40 °C)			
Hours	**Viscosity** [A]	**Change**	**Percent**
New Oil	VISNEW		
Initial [B]	VISINI		
TST H020	VIS H020	DVISH020	PVISH020
TST H040	VIS H040	DVISH040	PVISH040
TST H060	VIS H060	DVISH060	PVISH060
EOT	VISEOT	DVISEOT	PVIS

[A] *8000 cSt is maximum allowable viscosity*

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

Test Hours	**Initial**	TST_H020	TST_H040	TST_H060	**End of Test**
Iron	FEWMINI	FEWMH020	FEWMH040	FEWMH060	FEWMEOT
Copper	CUWMINI	CUWMH020	CUWMH040	CUWMH060	CUWMEOT
Lead	PBWMINI	PBWMH020	PBWMH040	PBWMH060	PBWMEOT

Sequence IIIH70
Form 8

Summary of Ring Sticking

Lab	LAB	Oil Code	OILCODE		
Stand	STAND	Test No.	TESTNUM		
Laboratory Oil Code			LABOCODE		
Formulation Stand Code			FORM		
Rater			RSRATER	Rating Date	RSRTDT

Piston	% Oil Ring Plugging	Ring Sticking[A]	
		Hot-Stuck Rings	Cold-Stuck Rings
1	ORP1	HSTUK1	CSTUK1
2	ORP2	HSTUK2	CSTUK2
3	ORP3	HSTUK3	CSTUK3
4	ORP4	HSTUK4	CSTUK4
5	ORP5	HSTUK5	CSTUK5
6	ORP6	HSTUK6	CSTUK6
Total		HSTUKT	CSTUKT
Average	ORPAVG		

[A] Possible values
T = top compression ring
B = bottom compression ring
O = oil ring
N = none

Sequence IIIH70
Form 9
Summary of Piston Deposits

Lab	LAB	Oil Code	OILCODE
Stand	STAND	Test No.	TESTNUM
Laboratory Oil Code		LABOCODE	
Formulation Stand Code		FORM	
Rater	APVRATER	Rating Date	APVRTDT

	Un-weighted Piston Deposits, merits										Weighted Piston Deposits	
	Grooves			Lands		Undercrown	Piston Boss Varnish					
	1	2	3	2	3		Front	Rear	Average			Merits
Piston 1	G1P1	G2P1	G3P1	L2P1	L3P1	UCP1	PBVFRT	PBVREA	PBVAVG1		Piston 1	WPD1
Piston 2	G1P2	G2P2	G3P2	L2P2	L3P2	UCP2	PBVFRT	PBVREA	PBVAVG2		Piston 2	WPD2
Piston 3	G1P3	G2P3	G3P3	L2P3	L3P3	UCP3	PBVFRT	PBVREA	PBVAVG3		Piston 3	WPD3
Piston 4	G1P4	G2P4	G3P4	L2P4	L3P4	UCP4	PBVFRT	PBVREA	PBVAVG4		Piston 4	WPD4
Piston 5	G1P5	G2P5	G3P5	L2P5	L3P5	UCP5	PBVFRT	PBVREA	PBVAVG5		Piston 5	WPD5
Piston 6	G1P6	G2P6	G3P6	L2P6	L3P6	UCP6	PBVFRT	PBVREA	PBVAVG6		Piston 6	WPD6
WF	0.05	0.10	0.20	0.15	0.30	0.10			0.10		Average	WPD

Sequence IIIH70
Form 10
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	BBYTH036	BLWBH036	BBYTH069	BLWBH069
BBYTH006	BLWBH006	BBYTH041	BLWBH041		
BBYTH011	BLWBH011	BBYTH046	BLWBH046	**Average**	ABLOBY
BBYTH016	BLWBH016	BBYTH051	BLWBH051		
BBYTH021	BLWBH021	BBYTH056	BLWBH056		
BBYTH026	BLWBH026	BBYTH061	BLWBH061		
BBYTH031	BLWBH031	BBYTH066	BLWBH066		

Sequence IIIH70
Form 11
Viscosity Increase Plot

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

VISINIM

Sequence IIIH70
Form 12
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	C2BDTAP	C2BDTL	C2BDML	C2BDBL	C2BDTAPL
4	C4BDTT	C4BDMT	C4BDBT	C4BDTAP	C4BDTL	C4BDML	C4BDBL	C4BDTAPL
6	C6BDTT	C6BDMT	C6BDBT	C6BDTAP	C6BDTL	C6BDML	C6BDBL	C6BDTAPL
1	C1BDTT	C1BDMT	C1BDBT	C1BDTAP	C1BDTL	C1BDML	C1BDBL	C1BDTAPL
3	C3BDTT	C3BDMT	C3BDBT	C3BDTAP	C3BDTL	C3BDML	C3BDBL	C3BDTAPL
5	C5BDTT	C5BDMT	C5BDBT	C5BDTAP	C5BDTL	C5BDML	C5BDBL	C5BDTAPL

Cylinder Surface Finish 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

Piston Ring End Gap (inches)						
	2	**4**	**6**	**1**	**3**	**5**
Top Ring Pre-Test	C2RGTPRE	C4RGTPRE	C6RGTPRE	C1RGTPRE	C3RGTPRE	C5RGTPRE
2nd Ring Pre-Test	C2RGSPRE	C4RGSPRE	C6RGSPRE	C1RGSPRE	C3RGSPRE	C5RGSPRE

Sequence IIIH70
Form 13
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 IIIH70
Form 14
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 IIIH70

Form 15
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 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 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