

**Report On**  
**Sequence IIIGA Evaluation**

**Version** IIIGA VERSION 20040521 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 conducted in a valid manner in accordance with the latest draft of Sequence IIIGA procedure and the appropriate amendments through the information letter system. 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

## Form 2

### Sequence IIIGA

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## Sequence IIIGA

### Form 3

#### Summary of Test Method

The Sequence IIIGA Test is a fired-engine, dynamometer lubricant test for generating a used oil sample to evaluate the low-temperature performance of automotive engine oils after operation in a high-temperature environment. 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 IIIGA Test utilizes a 1996 General Motors Powertrain 3800 Series II, water-cooled, 4 cycle, V-6 engine as the test apparatus. The Sequence IIIGA 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 IIIGA Test consists of a 10-minute operational check, followed by 100 hours of engine operation at moderately high speed, load, and temperature conditions. The 100-hour segment is broken down into five 20-hour test segments. Following each 20-hour segment, and the 10-minute operational check, oil samples are drawn from the engine.

The Sequence IIIGA Test is operated at the following test states during the 100-hour portion of the test:

Parameter	Set Point
Engine Speed	3600 r/min
Engine Load	250 N-m
Oil Filter Block Temperature	150 °C
Coolant Outlet Temperature	115 °C
Fuel Pressure	377.5 kPa
Intake Air Temperature	35 °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
Breather Tube Coolant Flow	10 L/min
Air-to-Fuel Ratio	15.0:1
Condenser Coolant Outlet Temperature	40 °C

**Sequence III GA**  
**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	TMC Oil Code <sup>A</sup>	IND
Test Length	TESTLEN		

<b>Pass/Fail Results</b>	
<b>Mini Rotary Viscometer Viscosity (cP)</b>	
Original Units	MRV
Transformed Results - LN(MRV)	TMRV
Industry Correction Factor	MRV_CF
Corrected Transformed Result	MRV_COR
Severity Adjustment	MRV_SA
Final Transformed Result	TMRVFNL
Final Original Unit Result	MRVFNL

<b>Additional Results</b>			
Oil Consumption Hours, h <sup>B</sup>	OCONHRS	Oil Consumption, L	OILCON
Yield Stress, Pa	YSTRESS		

<b>Most Recent Stand Reference Oil Test History<sup>C</sup></b>			
Test Number		RTESTNUM	
Oil Code	ROILCODE		
Date Completed	RDTCOMP	TMC Oil	RIND
Final Mini Rotary Viscometer Result, cP	RMRVFNL	Fuel Batch	RFUELBD

<sup>A</sup>Reference Oil Tests Only

<sup>B</sup>Test Hours at which Oil Consumption was calculated

<sup>C</sup>Non-Reference Oil Tests Only

**Sequence III GA**  
**Form 5**  
**Operational Summary**

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

Controlled Parameters	Parameter	Units	QI Threshold	EOT QI	Target	Average	Standard Deviation	Number of	
								Samples	BQD
	Speed	r/min	0.000	QRPM	3600	ARPM	SRPM	NRPM	BRPM
	Load	Nm	0.000	QLOAD	250	ALOAD	SLOAD	NLOAD	BLOAD
	Oil Filter Block	°C	0.000	QOTEMP	150.0	AOTEMP	SOTEMP	NOTEMP	BOTEMP
	Engine Coolant Out	°C	0.000	QCOLOUR	115.0	ACOLOUR	SCOLOUR	NCOLOUR	BCOLOUR
	Condenser Coolant Out	°C	0.000	QCCOLOUR	40.0	ACCOLOUR	SCCOLOUR	NCCOLOUR	BCCOLOUR
	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	QCOLFLC	160.0	ACOLFLO	SCOLFLO	NCOLFLO	BCOLFLO

Non-controlled Parameters	Parameter	Units	Average	Standard Deviation	Number of	
					Samples	BQD
	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	OCONH020	OCONH040	OCONH060	OCONH080	OCONH100
Level (ml) low	OILLINI	OILLH020	OILLH040	OILLH060	OILLH080	OILLH100
Total Oil Consumed (L)		OILCH020	OILCH040	OILCH060	OILCH080	OILCH100

NO <sub>x</sub> Measurement			
Hours	NOXHH019	NOXHH049	NOXHH099
NO <sub>x</sub> , ppm	NOX_H019	NOX_H049	NOX_H099

**Sequence IIIGA**

**Form 6**

**Used Oil Analysis Results**

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

<b>Cold Crank Simulator Results, D 5293</b>	
Specified Temperature, °C	CCSTEMP
Cold-Crank Simulator Viscosity at Specified Temperature, cP	CCS

<b>Mini-Rotary Viscometer Results, D 4684</b>	
MRV Temperature, °C	MRVTEMP
MRV Result, cP	MRV
Yield Stress, Pa	YSTRESS

**Sequence IIIGA**

**Form 7**

**Blowby Values & Plot**

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

**Blowby Plot**



<b>Test Hours</b>	BBYTH001	BBYTH006	BBYTH011	BBYTH016	BBYTH021	BBYTH026	BBYTH031	BBYTH036	BBYTH041	BBYTH046
<b>Blowby, L/min.</b>	BLWBH001	BLWBH006	BLWBH011	BLWBH016	BLWBH021	BLWBH026	BLWBH031	BLWBH036	BLWBH041	BLWBH046
<b>Test Hours</b>	BBYTH051	BBYTH056	BBYTH061	BBYTH066	BBYTH071	BBYTH076	BBYTH081	BBYTH086	BBYTH091	BBYTH096
<b>Blowby, L/min.</b>	BLWBH051	BLWBH056	BLWBH061	BLWBH066	BLWBH071	BLWBH076	BLWBH081	BLWBH086	BLWBH091	BLWBH096
<b>Test Hours</b>	BBYTH099	<b>Average</b>								
<b>Blowby, L/min.</b>	BLWBH099	ABLOBY								

**Sequence III GA**  
**Form 8**  
**Hardware Information**

Lab	LAB	Oil Code	OILCODE
Stand	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
Camshaft Batch Code	CAMBAT	Oil Cooler Batch Code	OILCLBAT
Cylinder Head Serial Number, Left	LHEADSN	Valve Springs Batch Code	VALSPBAT
Cylinder Head Serial Number, Right	RHEADSN	Lifter Serial Number	1 LFTR1SN
Bearing Kit Serial Number	BRNGSN		2 LFTR2SN
Top Ring Gap, mils	TRINGGAP		3 LFTR3SN
Bottom Ring Gap, mils	BRINGGAP		4 LFTR4SN
Intake Valve Seals Batch Code	INVSLBAT		5 LFTR5SN
Exhaust Valve Seals Batch Code	EXVSLBAT		6 LFTR6SN
Rocker Arm Batch Code	RARMBAT		7 LFTR7SN
Connecting Rod Type (CAST or PM)	CRODTYPE		8 LFTR8SN
			9 LFTR9SN
			10 LFTR10SN
			11 LFTR11SN
			12 LFTR12SN



## Sequence III GA

### Form 9

#### 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
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
TOTLDOWN			<b>Total Downtime (hours) – Maximum allowable downtime: 24 hours</b>

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

## Sequence III GA

### Form 9A

#### 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			<b>Total Downtime (hours) – Maximum allowable downtime: 24 hours</b>

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

## Sequence III GA

### Form 10

#### 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	STRRTIME	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 ESRQME No ORQME \*

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 ESNODEC \* 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*)

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

SUBNAME

\_\_\_\_\_  
Typed Name

SUBDATE

\_\_\_\_\_  
Date

SUBTITLE

\_\_\_\_\_  
Title